THE IRON TRADE REVIEW

VOLUME XXVI. CLEVELAND, O. OCTOBER 19, 1893. CHICAGO, ILL. NUMBER 42.

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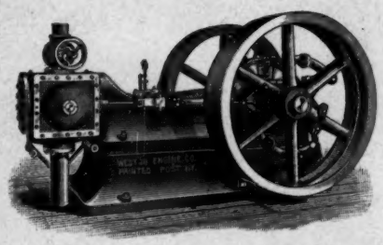

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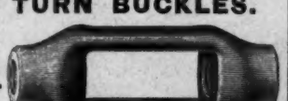

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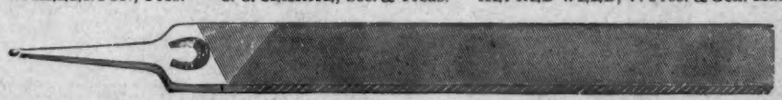

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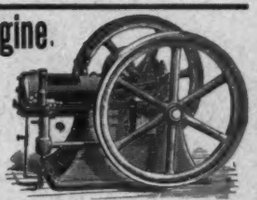

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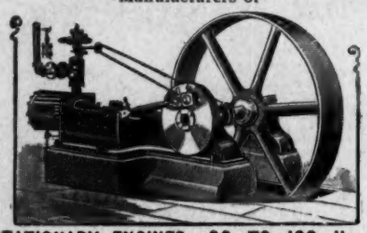

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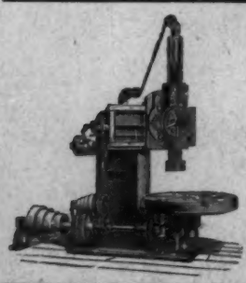

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THE IRON TRADE REVIEW

VOLUME XXVI. CLEVELAND, O. OCTOBER 19, 1893. CHICAGO, ILL. NUMBER 42.

THE WEEK IN IRON CIRCLES.

GENERAL FEATURES.

It has been apparent for some time that favored producers in iron and steel, whose low cost possibilities are a fruitful subject of market gossip, have exhausted their advantage and are straining every point to keep in operation on a tonnage basis that will save them from loss. It is yet to be demonstrated whether there is beyond the volume of business that has been gained recently, through these special inducements, a further fresh supply of orders that will keep mills now active, in operation into the new year, or whether the early fall activity has been the natural compensation for the inroad consumption made upon stocks in the long shut-down of Western mills. Nothing has developed within the week to indicate that demand is sensibly growing. Some new names are on the list of mills in operation, but others have dropped out of the race in certain departments and are waiting for orders. The starting up of the Edgar Thomson rail mill is an encouraging sympton as far as it goes, but there goes with it no assurance that any large tonnage has been booked, and while some rail sales are being made, there is no significant change in the outlook for standard sections. Some good sized contracts are reported at Pennsylvania mills for street girder rails. On these the Association price has been cut. The low basis to which Bessemer iron and steel billets have settled has attracted some inquiry on round lots, indicating that buyers are about to invest and would do so largely, if there were indications that present prices would be short-lived. The blast furnace situation presents the condition of the lowest active capacity in years and yet a slight accumulation of iron. The probabilities are that the piling up of iron and the continued shading of prices will lead more furnacemen to bank or blow out. Bessemer at Pittsburg is still at $11.50 @ $11.75, Pittsburg; gray forge, $10.75 to $11, and No. 1 foundry, $12.50 @ $13. Steel billets, with deliveries running to January, are quoted at $18 @ $18.50. Small lots command $18.75. The general business outlook has not improved and there is no reason to expect early betterment. The unconditional repeal of silver purchase is doomed, and early action of any kind by the Senate is improbable. And this means greater uncertainty as to tariff legislation, now that the pace has been set in obstruction. There will be no distinct development in business, can be none, until these two questions are settled and the intending buyer is given some data as to the basis of values in the year that is before him. Business covered up by silver and tariff legislation will remain hid. While there are increasing bank reserves and bank deposits, and the word is general that money is much easier and moderate loans are to be had, there is yet a vast volume of overdue indebtedness, on which there will be increasing pressure for payment. Renewals cannot be had indefinitely, and there are some indications that the money scarcity may be succeeded by a credit scarcity. The effect of the tariff uncertainty on iron and steel, visible in all departments of the trade, in paralyzing demand, is illustrated in the failure of an important and hitherto prosperous Eastern Pennsylvania concern. How long the iron trade at large can stand the strain depends upon how long certain gentlemen at Washington persist in being as those who having eyes see not.

THE CLEVELAND OUTLOOK.

There are goodly stocks of ore in valley and Pittsburg district furnace yards, the economy of direct loading from vessels into cars having been practiced very generally the past season. Appearances would indicate that most furnaces in these districts are supplied with all the ores they will require until well into the Winter. At all events, transactions are not any more frequent, and there is very little movement if one excepts ores sold as a sequel of Schlesinger's operations. Some of these have brought about $1 a ton less than the selling price at the beginning of the season. The Mesabi ores coming down are being quite well distributed, with a view to getting a general and thorough testing the coming Winter. Some of these soft Bessemers are finding a market at Pennsylvania furnaces on a basis competing with New York concentrates. In the far Eastern market there is little chance for Lake ores under present conditions. Foreign ores and the freights on them are lower than they have been for years and yet Eastern furnacemen hold off. The imports are consequently very light. Native Eastern ores, particularly New Jersey magnetites, are inactive also, and the outlook is for a dull Winter. Shipments of Lake Superior ports the past week have been somewhat heavier. The Duluth and Ashland rate weakened to 90 cents, but on Escanaba and Marquette ore 60 and 85 cents, respectively, were still the figures. Mesabi shipments thus far total about 375,000 tons.

Pig Iron. The inactive Valley furnaces promise to remain idle for some time to come, and just now there seems to be plenty of iron on the market on which owners are anxious to realize. Prices gain nothing in strength, and only furnacemen who are unhampered by early contracts, so that they can take advantage of present ore and coke prices, can be sure of getting a new dollar for the old. Foundry demand is halting, and jobbing foundries find little new work coming up.

Finished Material. The demand for mill products is reported by local selling firms to be far from satisfactory. Bar iron continues weak. The structural material market shows only a moderate run of small orders. Some bridge work is about to be let calling for considerable tonnage. Prices still tend downward. In Cleveland steel mills the working force has been lessened.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The past week has been a quiet one in respect to the amount of business done, and it is not probable that the present week will show any great increase in sales. The non-action of the Senate seems to have had a very discouraging influence upon the local markets, and as a consequence dealers are feeling a trifle less hopeful than they were a week ago. The market may be characterized as a waiting one, and users of all classes of iron and steel show a good deal of hesitation about placing orders. Collections are very good, in fact money is very plentiful, and the bank deposits are getting larger every week.

PIG IRON.—The largest sale of the week was one of 500 tons of Southern No. 2 soft to an implement buyer, at a figure slightly under the open quotation. Some few sales of 100 and 200 tons and of car load lots of both Northern and Southern coke were made, but the total was not large. A few inquiries are in the market for fair sized lots, but it is hardly likely that any sales of any size will be made in the near future. Orders for deliveries on contracts continue to be received at a very fair rate, but these are mostly from the manufacturers of agricultural implements. Jobbing foundries are still very short of business, as a rule.

BAR IRON.—Only a limited inquiry has been received, and no large sales have been made. Prices are unchanged at 1.45c to 1.50c for iron, and 1.60c to 1.65c for steel bars, f. o. b. Chicago.

RAILS AND TRACK SUPPLIES.—The demand has increased slightly in the past week, but no large orders have been placed. Prices are unchanged. Rails, $30 to $32; track bolts, 2.55c to 2.60c; spikes, 1.90c to 1.95c.

STRUCTURAL MATERIAL.—The largest order of the week was one of 250 tons for a brewery in Milwaukee, taken by an Eastern company. The demand for small lots is a little better than it was in the previous week. Quotations are unchanged. Beams, 1.85c to 1.90c; angles, 1.80c to 1.90c; plates, 1.90c to 2c; tees, 2c to 2.10c.

SHEETS.—Black sheets have been quiet in the past week, with only a fair demand from store. Prices remain unchanged at 2.75c to 2.80c, f. o. b. Chicago. Galvanized sheets have had a fair sale, with quotations the same as last week—70 and 10 and 5 per cent. discount.

MERCHANT STEEL.—The demand has been quiet from the general trade in the past week, and there were no large sales made. Prices are as last reported. Open-hearth spring steel, 2.25c to 2.30c; machinery, 2c to 2.20c; tire, 1.95c to 2.10c; crucible spring, 3.50c; machinery, 4.50c to 4.75c; tool steel, 6½c and upwards.

PLATES, TUBES, ETC.—Business has been fairly good, but no increase in the demand is reported. Prices remain as last reported: Tank steel, 1.75c to 1.80c; shell steel, 2c to 2.10c; flange steel, 2.25c to 2.30c; fire box steel, 3.75c to 4c; tubes, 65 to 67½ per cent. discount.

OLD RAILS AND WHEELS.—Prices are only nominal, as no business has been done. Old rails, $14.25 to $14.50; old steel rails, $10 to $13, according to length; old wheels, $13 to $14.

GENERAL MARKET RESUME.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The limited amount of business, the past week, and the uncertainty of prices, makes it difficult to reflect the actual status. One transaction of which a good deal has been said is a sale of 12,000 tons of rod billets at a low price. This large tonnage was secured by the cancellation of an old contract for a smaller amount and at much higher prices. Deliveries extend over six months. The price was close to $17.75 maker's mill; it is denied that it was as low as $17.50. There seems to be a smaller mill capacity active than one week ago, and there are some indications that prices are, if anything, a shade lower. Almost any concession will be made for a good-sized order. The size of the order and the time of payment have much to do with the price, and special condition sales are not to be taken as the market. Bessemer pig iron has sold down to $11.50 Pittsburg, as heretofore reported, but on November and December deliveries $11.75 has been obtained. Sales of a few hundred tons of neutral muck bar are reported at $21.10. Gray forge has been sold at a range of $10.75 to $11.00. One sale of 2,000 tons at $10 is a sequel of a recent sheriff's auction.

Cincinnati. While there are no increased signs of life in the pig iron market, there are evidences of a little more confidence. The waiting attitude prevails in every department of the iron trade. Consumers and producers alike seem to think that a turn will come before many months and it is likely to be a decisive turn. At the same time, there are no signs of any change in the immediate future, and the almost invariable policy is to run very close to shore, buying only such supplies as are needed to run in the actual orders for work. No further important changes in furnace output are noticed. Renewals are becoming scarcer but have not been entirely eliminated as a feature of the situation. Requests for accommodation now are not granted with the freedom which they were when banks were not offering any accommodations. No change can be noted in prices. Southern irons continue to go forward as fast as produced, and on some grades there is a scarcity.

St. Louis. The iron market west of the Mississippi river is almost lifeless. The demand is only for small lots, mostly car load orders, and little or no improvement in sight. Money is easier and can be procured freely on good security. All manufacturers complain of the dullness of trade, and competition for small business is so strong that profits are cut down to a very close margin.

Buffalo. The past week has recorded a season of exceptional quietness so far as sales are concerned. There has been some inquiry, but a waiting policy seems to have again seized the trade. Purchases are being put off from ten days to a month, carloads or fifty tons being ordered forward for immediate needs. As a rule buyers are looking for a change, or for something a little more definite to turn up.

Louisville. The market has shown no change as far as actual sales are concerned, the furnaces now in blast having sufficient orders on hand for immediate delivery. The feeling, however, among buyers is less encouraging and while they are purchasing in small quantities for delivery this year, the unsatisfactory condition of affairs at Washington is checking future buying and causing many to believe that prices will remain as at present. On the other hand, furnaces feel that there is nothing left to be done but blow out even more stacks, if prices do not improve in the near future. It is impossible to make iron on the basis of present figures. There have been a number of sales, mostly in car load lots, but several of 500 tons, with prices in the neighborhood of $8.25 for No. 2 foundry and $7.50 for No. 3. Car works are largely closed down for lack of order, swith no immediate prospects of resuming.

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

PUBLISHED EVERY THURSDAY BY
THE IRON TRADE REVIEW CO.,
CLEVELAND, OHIO.

CLEVELAND:
27 VINCENT STREET.
A. I. FINDLEY, Editor.

CHICAGO:
1437 MONADNOCK BLOCK.
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OCTOBER 19, 1893.

PIG IRON COSTS ON THE NEW BASIS.

There has been a revision of cost sheets in the iron trade within the past six months—a revision, at least, by such manufacturers as have bought their raw material on the panic basis. Where old contracts for ore, for example, or for coke, are still in force, the total of cost items, for the blast furnace manager, has not sensibly lessened with the exception of labor. Manufacturers who begin with pig iron, with billets, or with rods, have bought, of late, at reductions secured largely at the expense of furnace companies. Ore contracts made last Spring and Winter by furnaces supplied with Lake Superior ores are still in force, and are well known to be on a higher basis than that of present purchases. In coke the difference is not so great, but that market, too, has been steadily in favor of the later buyer.

A little figuring will show that the cost line, on Bessemer iron, at least, has been closely approached in some recent transactions, even were the ore prices now current to be made the basis of reckoning.

A 65 per cent. Bessemer ore at $3.25, Lake Erie port, would cost $3.80 at Valley furnace. Allowing for moisture, and reckoning 1⅔ tons for a ton of pig iron, the cost would be $6.34.

Coke at Valley furnace would cost $2.35 for sufficient to smelt the ore for a ton of pig iron—$1.10 for 2,000 pounds of coke and $1.25 freight.

Limestone may be fairly reckoned at 30 cents to a ton of iron.

Labor items, including superintendence and clerical work may be counted at 90 cents.

Reckoning $30,000 for a year's repairs and renewals on a furnace of, say, 60,000 tons annual capacity, we have 50 cents a ton for that item.

Recapitulating, the account stands:

Ore	$6.34
Coke	2.35
Limestone	.30
Labor	.90
Renewals	.50
Total	$10.39

The above reckoning is about 85 cents too low on ore cost to furnaces that contracted early in the season for Bessemer ores at $3.75. But such furnaces are able now to reduce the cost of their mixture materially by the purchase of ores close to the Bessemer limit, selling to-day at $2 85. And where all the ores used are bought at present prices, it can be seen that the figures above given may be reduced by the employment of such non-Bessemers in the mixture.

With the exception of the allowance for renewals, in our computation, every item is on the minimum basis, and the labor cost is such as would be attained in a furnace of modern construction and of maximum output. It can be seen that the margin must have been on the wrong side, when furnaces of only average economy in operation and whose ore purchases were made last winter, parted with their product on a $11.50 basis, Pittsburg, or $10.85 in the Valley.

Calling our total above $10 50, and reckoning $6.50 for conversion—not the absolute minimum, we know, and yet better than the average cost, and we have $17 as the cost total for steel billets, where billet maker and furnace operator are one. The recent purchase for Cleveland delivery, at $17.75 Pittsburg mill, makes a very thin partition between cost and selling price, it must be admitted; with many mills it would mean a loss of from $1 to $2 on every ton.

It must be apparent that the possibilities of further economies, that would permit lower prices on Bessemer iron or soft steel, are exceedingly meager.

STILL ROOM FOR CURTAILMENT.

The fact that pig iron stocks have shown a slight increase at the beginning of each month since June, while production has slowed down at a pace unheard of, reflects quite as well as market reports the low consumption of the country since business began to decline. Two hundred fewer furnaces were in blast Oct. 1 than on the same date in 1890, the year of highest production, 116 against 337. Comparing the weekly capacity of active furnaces with the pig iron output of last year, we find that the rate of production Oct. 1 means about 3,900,000 tons a year, while the output in 1892 was 9,157,000 tons —a falling off of 57.5 per cent. On Oct. 1, 1892, the rate of production was 161,558 tons; this year on the same date it was but 48 per cent. of that amount. One year ago consumption was in excess of production and the decline of stocks in September, October and November was rapid. Now there is an accumulation. It is plain that current consumption is not more than 40 per cent. of what it was one year ago. More idle stacks must be seen before supply and demand will come into such a relation as will induce firmer prices.

The decline in coke iron production has been sharper than in either anthracite or charcoal. May was the month of largest production, this year. Setting down the active capacity for each kind of iron on May 1 side by side with the figures for Oct. 1, the different rates of decrease are shown:

	May 1, 1893.	Oct. 1, 1893.	Per cent. Decrease.
Charcoal	8,568	5,845	31.7
Anthracite	23,739	15,578	53.8
Coke	144,675	55,911	61.3

At no time since the pig iron industry was established in those States, it is safe to say, has it been true that every stack was out, in West Virginia, Indiana, Illinois, Wisconsin, Minnesota and Texas. Yet that was the condition on the first of this month. And New York and Kentucky showed a practical suspension, having but one active furnace each.

Some signs of increasing furnace activity are seen in the Pittsburg district, but the product will all be used in

the maker's mill. Furnaces making for the general market will not be in a hurry to get into blast; it is probable that only the smallest fraction of those now inactive could make ends meet on the present market basis.

FROM THE MOLDERS' STANDPOINT.

The *Machinery Molders' Journal* complains of the reports daily sent out by telegraph, of the opening of mills and factories, because they "send men on a wild goose chase in search of employment and compel them to spend the little money that is left them." The *Journal* calls attention to three dispatches in one week in the daily papers, stating that three large manufactories had resumed with a full complement of men, while letters received from molders' union secretaries in these places showed that the reports were without foundation. As to the prospect, it adds:

Our reports this month indicate that there are as many members out of work as there were last month, with no prospect ahead of any speedy change in the situation. At the same time large reductions in wages have been made all over the country. Our business interests are so interwoven that a reduction of wages in Milwaukee compels a reduction in New York, a reduction in Cleveland is felt to the Gulf of Mexico.

This last factor is such a potent one that men who refuse to affiiliate with the organization of their trade and assist their brother workmen in the struggle to maintain wages at a living price, not only do themselves and their dependents an injury, but perpetrate a crime against society in general. The universal stoppage of consumption has forced a stoppage of production; low wages will not tend to improve this condition but rather make it worse.

Low wages are one of the most deplorable features of the present unfortunate situation. Low prices, that wipe out profit on manufactures, are also deplorable. And it counts for just as much, in these untoward times, to say that low prices of commodities "will not tend to improve this condition, but rather make it worse," as to make the same remark about wages. There is no more option to the manufacturer in the matter of wage reductions, than there is as to the price at which his product sells in the market. If he could keep both up, how gladly would he do it.

A Cincinnati dispatch indicates a prevalent view among iron molders in general, as well as those in machinery lines, represented by the *Journal*, that their employers have a choice in this matter. The executive board of the International Iron Molders' Union, in session at Cincinnati, considered the complaints coming up to it from different parts of the country, of "cuts in wages which are causing hardship to individual members in large numbers." The dispatch adds: "It is the feeling of the committee that the time has come not only to resist cuts but to ask for an advance in wages. It is claimed that wages have gone lower in iron than in other trades."

If manufacturers were to meet and resolve that the time had come not only to resist cuts in prices but also to ask for an advance, because prices in the iron trade had sunk deeper than in other lines, they would be credited with resolving to do a very desirable thing, yet there would be a general sentiment that if they succeeded, under present conditions, they would have accomplished a feat without a parallel in the history of trade. The failure of English colliers to recognize that higher wages could not be paid on a falling market, with returns on mining investments growing less, and foreign competition pressing harder, has brought starvation to thousands and the loss of millions to capital, but it has not brought the higher wages sought.

That wages and prices should fluctuate together is the ideal condition. Capital may at times refuse to share with labor under a steady market advance; labor may refuse to concede lower wages when prices shrink. Millions would be saved and senseless tests of endurance avoided, if there could be a mutual recognition of the justice of the sliding scale, with no limits at either end.

THE decision of the silver question by an appeal to Olympic regulations is perhaps the most novel as well as the most exasperating development of the Senate procedure of these weary weeks. We may now look to see the terms of the compromise fixed by putting up a Senator from each side for a Sullivan-Corbett contest, and permitting the victor to dictate details. On nothing in recent years has there been such an unanimity among the business interests of the country as on the call for the repeal of the silver purchasing provisions of the Sherman act; and the United States Senate responds to the demand for a sound currency by admitting its impotence to do more than display the relative soundness of Senatorial physiques. Evidently the States have been making a great mistake in failing to consider nerve and sinew and capacity for standing all-night sieges, in casting up the qualifications of Senatorial candidates. Perhaps our American policy of settling financial and economic questions at the polls is quite as much of a success, after all, as a body of statesmen, so-called, without ability to discover what its majority wants to do, or power to embody the majority's will in legislation if it should be discovered.

A PITTSBURG tin plate manufacturer brings to book the tin plate prevaricators in this plain statement of the effect of the duty on the market price:

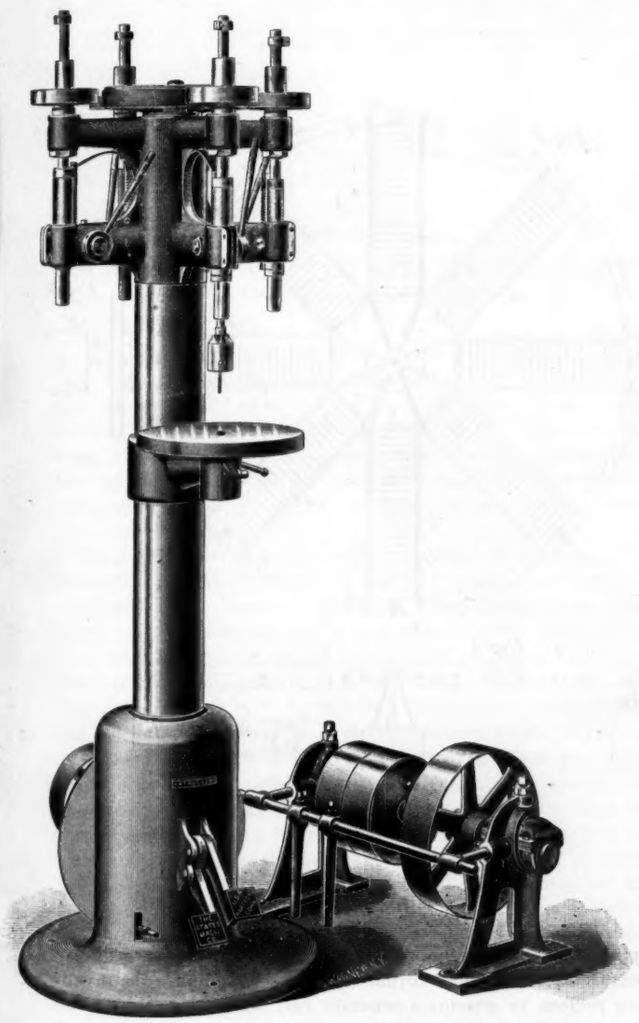
Before the act imposing a protective duty on tin plate was passed, the foreigners fixed the price to suit themselves, having run it up as high as $12.50 per box. On October 7, 1890, the price in New York was $5.50, and in Liverpool $4.11. This was nine months before the tin plate duty went into effect. On August 24, 1892, the price in New York was $5.15, and in Liverpool $2.96. This was nearly 14 months after the additional duty of $1.29 per box, imposed by the McKinley bill, had been in force. This shows clearly that the additional duty had been paid by the foreign manufacturer. The price to-day is $5.35 per box, or 15 cents less than it was nine months before the duty went into effect, so that there cannot be the slightest doubt that our people are now getting their tin plate for 15 cents a box less than it cost them nine months before the tariff was imposed, and in addition the Government is getting $1.29 more duty paid by the foreign manufacturers than it was three years ago.

ALMOST weekly, in some metropolitan newspaper or other, we are treated to a column and a half or upwards, of special correspondence, giving the "inside facts," concerning the "powerful Lake Superior iron ore trust." The same ground is traversed that has been covered a score of times before—the steam shovel mining on the Mesabi; the hard ores of the Vermillion; the powerful aggregation of capital that is represented in the new combine; the history and composition of the Minnesota Iron Co., "hitherto the strongest factor in the Lake Superior iron world;" the preparations on both sides for a "battle of giants;" the introduction of "Standard oil methods" in the iron ore business, etc., etc. Some of these days a few able managing editors may be helped to discover that there is also a steams-hovel method in journalism and that certain around-the-lakes correspondents are working it most industriously.

NEW SENSITIVE DRILL PRESS.

We show herewith an illustration of a new four-spindle sensitive drill press, embodying some novel features for which patents have just been issued. The construction and mechanical design are entirely different from anything made, and the results are effective.

The column is in one piece, holding at the top a revolving head, with four arms set at the opposites which carry the drill spindles with the usual parts for a sensitive feed. The drive is from the bottom, by a two-inch belt, but from this point the transmission of power is by friction only. The shaft of the belt pulley, held in an adjustable box, has at the further end a friction disk running in contact with a friction wheel splined on the main shaft. This shaft, stepped at the bottom and running in an adjustable box above, is set eccentric to the column and carries at the top another friction wheel. To the lever friction wheel is attached a pedal lever, extending outside the column, and with a second lever geared to and lying beside it. The small lever at the left connects with a tapered spring plug which when drawn down allows the head to revolve freely, and when released centers any spindle positively over one point



on the table. The top friction wheel being eccentric, only one drill spindle pulley can come in contact with it at a time, and that only when nearest the largest eccentricity. The result is that while the machine is running, the head holding the drill-spindles is quickly thrown around, bringing the desired tool inoperative and free, by leaving the head anywhere between the four centres. Further, while the machine is running the speed of any spindle can be changed to suit the operator, in the ratio of 5 to 20 up or down, by the foot lever; and at whatever point the foot is removed that speed remains constant by the interlocking of the gears.

A novel feature of the machine is the spring device on the spindles. This spring is flat, ⅝″ wide, and lies outside, conforming to the line of the frame. When the spindle is drawn down by the rack and pinion, this spring gradually leaves its backing against the frame and virtually grows longer, equalizing the tension the entire throw. Another feature is a new countershaft accompanying the tool which is entirely self-oiling. The self-oiling loose pulleys have a record of two years constant running without touching them, a very desirable addition to a countershaft on any machine shop tool.

The tools are patented and made by the States Machine Co., Hartford, Conn.

The South and Iron Exports.

We print in this issue an article by Mr. Maxwell, a mining engineer, that shows the advantage the South's pig iron trade is to get from various conditions, now transpiring. This, of course, is interesting; but of far greater interest would be some evidence that the South was about to utilize her raw material by working it into forms of utility. The supply of raw iron will take care of itself, no doubt about that. We have shown that Alabama and Tennessee can make good pig iron cheaper than any other part of the world, and that disposes of the whole question, so far as this last important branch of the iron trade is concerned; and that may be dismissed from further discussion. What is needed in the South is diversified iron and steel products. We must become makers of every form of iron material in its most advanced stage, or we shall linger in he rear, a mere hewer of wood and drawer of water, for more ingenious communities and enterprising countries.

The *Tradesman* would by no means undervalue the export of Southern pig iron to England, lately advertised; though it would regard as ten times more importance an exportation of Southern made tools, engines and machines to any foreign country, in competition with English makers of the same. The filling of an order, however small, from the Central and South American States, by the Chattanooga Plow Co. or the Birmingham Rolling Mill Co., is worth more to the South, in the long run, than the export of a half million tons of crude iron, to any country. What is needed here in the South is that we first make every tool, machine, etc., to be made of iron and steel, that our own people need, and then that we reach out for an export business, in both crude and finished materials. The South is the only part of the country that can make pig iron so cheaply as to compete with England, in England or elsewhere. Hence the South has an enormous advantage, to start with, in competing with England in finished products of iron. Only capital, skill and enterprise are needed, to make of the Southern district the greatest iron and steel center of the world. What Mr. Maxwell says about the possibilities of sending Southern coal to Central and South America ought to be an old story. Alabama should long since have captured the whole West Indian and South American coal trade.—[Chattanooga Tradesman.

Heavy Failure Due to Tariff Uncertainty.

After a considerable interval of freedom from such announcements, a heavy failure in the iron and steel trade has occurred in Eastern Pennsylvania—the Wellman Iron & Steel Co., of Thurlow. The plant was originally the Chester Rolling Mills, started by the late John Roach, and was one of the most extensive in the East. A syndicate, headed by Samuel T. Wellman, formerly of Cleveland, purchased it a few years ago, and re-organized the company under the present name.

The capital stock of the company was $1,000,000, paid up, and the plant represents an investment of $1,500,000, being one of the best equipped steel plants in the country. Twelve hundred men were employed. The direct cause of the failure was a judgment entered against the company by the Delaware County National Bank for $64,000. This judgment was given to the bank as collateral security for three notes which it held, and which were indorsed by Samuel T. Wellman, John P. Crozer, and Richard Peters, Jr. The bank being amply protected by the indorsers, who are all men of wealth, was averse to pushing the company at this time, but the indorsers insisted that judgment be taken in order that money might be realized from personal property at the mills and they be relieved from payment of the notes. The failure, which is said to be complete, will cause no loss to the bank. The plant is closed, a deputy sheriff having been placed in charge. The liabilities of the company aside from the judgment cannot now be learned. The failure is said to be due to an inability to secure orders because of the fear of tariff changes on iron and steel and the stringency in the money market.

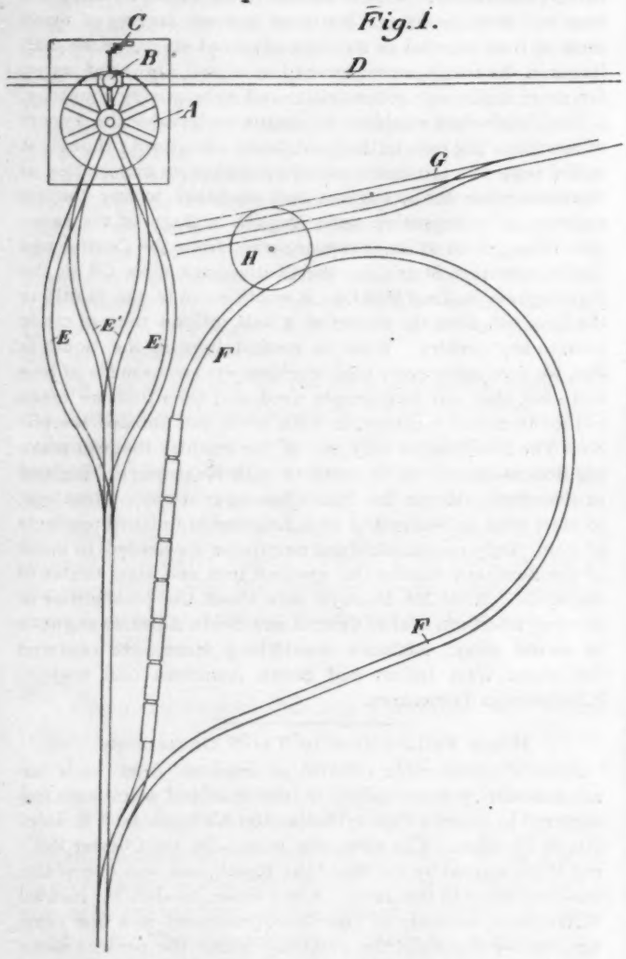
APPARATUS FOR CASTING PIG IRON.

The inventor of the apparatus, illustrated in this connection, Henry D. Hibbard, of High Bridge, N. J., is a practical steel melter who met with the usual trouble in making basic open-hearth steel from the ordinary sand-covered pig iron the market affords. The sand being, chemically speaking, chiefly silica, not only cuts and wastes the basic bottom but seriously retards or stops the dephosphorization of the charge and so depreciates the value of the product.

In considering the matter of the production of suitable sand—free pig the idea of casting in tilting moulds mounted in a turntable came up and has been embodied in U. S. patent, No. 486714. It was seen that, together with the production of clean pig there would be a great saving in labor, some of which is perhaps the hardest toil from which mankind has not hitherto been emancipated by the development of labor-saving machinery.

The cuts show the arrangement of the parts. The moulds are filled on one side of the table and when the iron has solidified, dumped while still red hot on to cars beneath the turntable on the other side, the table being revolved to bring the mould series successively in position for filling. The pigs are for the most part broken from the sow by the fall but men must be ready with sledge and bar to supplement such action in case some still remain not broken off.

Fig. 1.



The capacity of one turn-table with eight double sets of moulds is estimated at 1,000 tons per 24 hours. The double sets of moulds make each series in balance when empty and top heavy when filled. The cold side is presented ready to be filled on dumping.

The iron is run from the blast furnace into 20 ton ladles, which are hauled to the cast-house and cast in succession. By suitable tracks, water-cooling appliances, cars, cranes and engines all the pig from a large plant of furnaces may be cast, cooled and loaded for shipment at one point without a pig being lifted by hand.

Melting in cupolas forms usually the first step in the consumption of pig iron, the sand on the pig causing expense at every turn. The sand itself, its freight, handling, fluxing, melting and disposition in the form of slag, and the loss of iron contained in the slag all absorb money which is lost.

Referring more specifically to the cuts, Fig. 1 is a plan view showing the improved metal casting apparatus in conjunction with a series of tracks and a crane adapted to its easy practical operation. Fig. 2 is a plan view on a larger scale. Fig. 3 is a partial end view of the turntable. Fig. 4 is a cross-section on the line IV, IV of Fig. 2. A in Fig. 1 represents a turn-table carrying a series of the improved molds. B is a ladle by which the molten pig metal may be delivered to the molds. C is an engine for turning the table A, though it may be turned by hand or other power. D is a track on which the ladle may be carried by cars from the blast furnace to the mold table. EE′ are tracks and switches for the cars into which the pigs are delivered from the molds on the table. F is a track upon which the cars laden with pigs may be run, and on which the cars may stand while the pigs are cooled by water or otherwise. G is a shipping track and H is a crane by which the pigs may be removed from the cars on the track F to cars on the shipping track. The apparatus may be situated in the ordinary cast house of the blast furnace, but for convenience the inventor prefers to employ a separate cast house for casting the product of a whole blast furnace plant and to convey the metal in ladles from the furnaces to the apparatus.

Fig. 2.

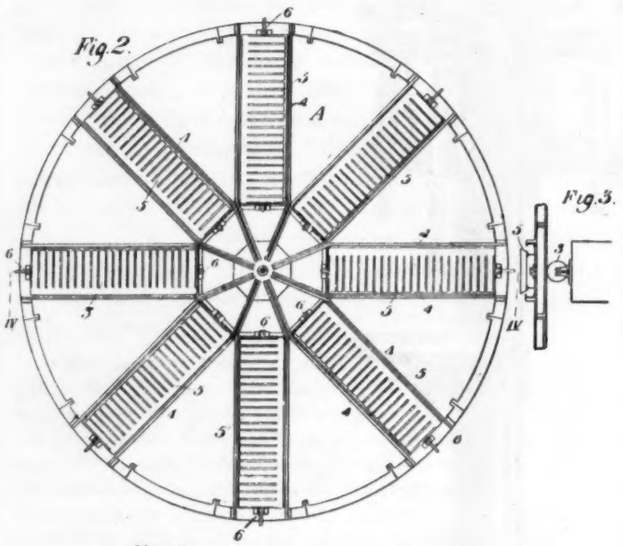
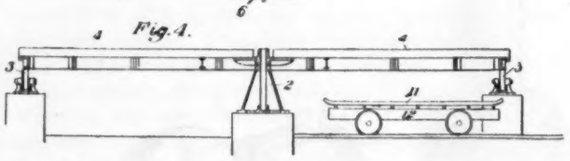


Fig. 3.

Fig. 4.



The operation is as follows: The table having been turned to bring one of the lines or series of molds into position to receive a cast of metal, the metal is conveyed thereto in a ladle or in a runner-trough, and being poured into the series flows into the several connected mold-cavities and forms a series of pigs with a connecting sow. The table may then be turned to bring another of the radial series of molds under the ladle or runner to receive a charge of metal, and as each series of molds reaches a position over the cars for receiving the pigs, and when the metal therein has solidified, it is upturned on its pivot in either direction, thereby discharging the metal upon the car, clearing the mold from any impurities and bringing the opposite and cooler series of molds into an upright position for the next cast. This overturning of the

molds is easy, because the weight of the pigs in the upper molds makes the series top-heavy and easy to tip, whereas when the molds are empty their frame is balanced by equilibrium of weight above and below. Instead of discharging the pigs directly upon the body of the car, there may be placed on each car a removable cradle or frame. The cradle may be provided with suitable projections, so that when the contents of the molds are dropped thereon the sow may be broken by the fall and separated from the pigs. When the cradle has received a load of pigs from the mold, the car may be drawn on the tracks to the crane H, where the cradle may be lifted and its contents discharged as a whole upon the cars on the shipping track.

The net saving to a works which makes and consumes its own pig is estimated at 30 cents a ton as follows:

ESTIMATED COST OF USE OF SAND.

Cost to producer:		
Making up sand pig beds per ton	$ .10	
Carrying and loading pig per ton	.15	
Sand per ton	.02	.27
Cost to consumer:		
Assumed average freight on sand per ton of iron	.03	
Unloading and charging	.01	
Limestone to flux	.03	
Coke to melt	.02	
Disposing of 100 pounds slag	.03	
Loss of iron in sand and cleaning yard	.01	
Loss of iron in slag 15 per cent. in 100 pounds	.10	.23
Total cost		.50
Deduct:		
Interest on plant	.01	
Moulds	.08	
Labor	.06	
Supplies	.02	
Wear and tear and depreciation	.03	.20
Net saving to consumer		.30

AMONG THE IRON MINES.

Menominee Range:—

The annual report of Mine Inspector Trestiral shows the following production by Menominee range mines located in Michigan: Chapin, 404,397 tons; Pewabic, 183,128 tons; Millie, 10,301 tons; Keel Ridge, 4,243 tons; Quinnesec, 890 tons; Norway and Cyclops, 18,924 tons; Aragon, 144,848 tons; Curry, 88,035 tons; West Vulcan, 116,385 tons; East Vulcan, 111,704 tons; Loretta, 6,500 tons; Appleton, 8,000 tons. Total —1,097,555 tons.

The official investigation of the Mansfield disaster ended in a verdict placing the blame on the mining company and particularly upon President Calhoun. The finding is in these terms: "We find that death was caused by the caving in of the Mansfield mine, caused by the criminal act of the Mansfield Iron Mining Co. in neglecting to fill the mine as the ore was being moved out. We further find that the local management of the mine was acting upon the instructions from the general manager (president) of said Mansfield Iron Mining Co., and was in no way to blame for the accident," Employes of the company testified in the course of the investigation that the third and fourth levels of the mine were filled but that the process of filling on the fifth level had been stopped by Prest. Calhoun and orders given to direct all the energy of the working force to getting out ore until after navigation, when filling could be attended to. It is now stated that the mine will be re opened. The cost is estimated at $20,000 to $25,000.

Vermilion Range:—

Two Harbors shipments in the week ending Oct. 12 were 22,362 tons of Vermilion ore and 4,234 tons from the Mesabi, the Franklin being the only Two Harbors shipper on that range. Total for the season—724,258 tons of Vermilion and 64,637 tons of Mesabi.

Mesabi Range:—

The *Mesabi Range* thus quotes H. V. Winchell, Assistant State Geologist of Minnesota: "The fact that the Biwabik mine continues to ship ore under present conditions of the market, when other mines all over the country are closed down, is very conclusive proof to my mind that the mining can be and is done at very low cost. The big deposits of this range are steam shovel deposits, and while it will cost the underground mines more to produce ore, the percentage of underground mining will be so small that the average cost will not be very much increased. Besides this, I have been informed by Supt. Pearce of the Commodore, that at the present time that mine, which is a shaft property, is producing ore at 55 cents per ton and that the cost will undoubtedly be reduced to 40 cents in the near future. We know already what it will cost to mine with steam shovels. It is not at all a difficult problem to solve. We know what it costs to remove earth and we know how much earth there is to remove. I for one cannot see why the average cost of mining on this range should exceed 25 cents per ton."

The litigation that beset the Duluth, Mesabi & Northern about the time its bonds were being placed has been renewed from a fresh point of attack. A Duluth special says that action has been begun against the road in which it is alleged that it is insolvent; that it defaulted its last payment of interest on bonds, and has illegally favored some of its creditors by paying them in full. The plaintiffs name as co-defendants the claimants who filed liens against the railroad and the Central Trust Co., and the Metropolis Trust Co., of New York, which hold the bonds of the road.

Approximate shipments from Mesabi mines for the season thus far are: Cincinnati, 10,000; Canton, 25,000; Franklin, 28,000; Hale, 2,200; Duluth, 38,000; Biwabik, 80,000; Minnewas, 12,000; Oliver, 40,000; Mountain Iron, 55,000; Commodore, 70,000.

Several shipping contracts for winter work on the Biwabik have been let.

A correspondent, who made a trip, recently, over the Duluth, Mesabi & Northern, gives this description of operations at the Mountain Iron: "To the right of the track the ground rises bluff-like some 75 feet. Through this bluff, and parallel with the railroad a cut has been made of about 100 feet, and varying in depth from 60 to 80 feet. The stripping before the ore is reached seems to be not over ten feet, some places less. After the stripping has been taken off cuts through the ore itself have been made, and in these tracks are laid. The mode of mining seems almost perfect. The cars are pushed in on the track and along side of the track is a steam shovel by means of which the ore is loaded with apparently as little effort as mud and sand is taken from the harbor by the dredger. The writer timed the loading of the cars and a car of twenty-five tons capacity was loaded in four minutes with ease. We were informed, however, that only ten cars per hour were actually loaded. The scheme of mining seems to be that after the ore in this cut of one hundred feet has been taken out, to strip the next one hundred feet and throw the stripping by means of a steam shovel into the first cut.

The Biwabik mined and loaded upon cars in a nine hour day last week 1,950 tons. In the full day and night shift 4,000 tons were mined. The ore was handled by one steam shovel working directly in the bed of soft ore.

Marquette Range:—

The pumps were taken out of the Champion mine on Saturday and the small force of men employed discharged. The Champion is among the largest mines in the county and could produce from 360,000 to 500,000 tons of Bessemer ore annually. The company owns the fee and have an equipment equal to any in the Lake Superior region.—[Negaunee Iron Herald.

Mr. W. G. Mather, president of the Cleveland-Cliffs Co., is in town. He has nothing new to present regarding the resumption of operations at the mines of his company. There is no change in the situation. There is no market, no business. At the Salisbury mine they had no trouble from caving or settling ground during the week. Water was forked on Tuesday, and Wednesday morning all the men were at work again as before the accident. Work upon the new engine and boiler house is being pushed as rapidly as possible so that the plant of machinery may be transferred to this point as quickly as can be. With this change made the mine will be in better shape for production than before.—[Iron Ore, Ishpeming.

THE Sykes Steel Roofing Co., of Chicago, Ill., and Niles, O., have been awarded medal and diploma at the World's Fair on their "Sykes Patent Cap" steel roofing.

REICHELM'S ROTARY FORCE BLAST BLOWER.

We present herewith engravings of a new positive blast blower which has been designed to be used in connection with the gas furnaces and oil gas machines made by the American Gas Furnace Co., of 80 Nassau street, New York, which company also builds the blower.

By reference to the sectional views, Figs. 3 and 4, the construction of the blower will be readily understood, the course of the air through the machine being shown by the arrows. Within a cylindrical casing a shaft is placed eccentrically, upon this shaft being the drum A in which are placed four vanes which are so arranged as to move radially in suitable slots as the drum revolves; the extremities of these vanes being thus kept against the inner surface of the casing. Concentric with the casing, but eccentric with the drum, are annular grooves formed in the sides of the casing, the location of these grooves being indicated by the dotted circles, Fig. 3. Fitted to these grooves are rings which are shaped as shown by the section Fig. 4, these rings being free to turn within the grooves, and, in fact, turning with the drum and vanes. Lubricant is supplied to these rings through the annular chamber *a*, communicating with which there are oil holes as shown which allow oil to flow to the space above in which are placed four sections of rings, each of these sections having a hole through its center in which is fitted a pivot that is attached to the side of a vane, each vane thus having a pivot at each side. Fig. 4 shows a section of the sliding section or block with the pivot in place. Some consideration of Fig. 3 will show that the movement of these pivots within the sliding blocks is an oscillating one, and that the motion of the blocks within the ring is relatively slight. The effect of the arrangement is, however, that the vanes are kept in proper place at all times, without the use of springs, and the centrifugal force of the vanes does not act upon the inner side of the casing to produce excessive friction, but is taken by the ring, within which it is nearly balanced at all times, so that its effect upon the working of the blower is nearly eliminated.

It is especially to be noted that this construction gives a positive movement to the blades which keeps them always in their proper places, and that owing to the fact that no room is required under the blades for springs, which, when used, must contract and expand the full movement of the blade, the working space, *i. e.*, the difference in diameter between the casing and the drum, can be relatively great, and thus a large capacity be secured for a given size of machine, the positive movement of the vanes insuring that the full nominal capacity is at all times made use of.

The abutment at the bottom of the case is just in contact with the drum A at all times and serves to separate the chambers for the incoming and outgoing air. Lubricant is automatically supplied to this abutment.

The construction of the machine is such that it is practically noiseless, and can be used in positions where a machine making a noise would be inadmissible, at the same time its efficiency as shown by tests is very high. A blower, theoretically capable of delivering 1,320 cubic inches of air at atmospheric pressure per revolution, when running at 180 revolutions maintained a pressure of one pound per square inch when discharging into the atmosphere through a round nozzle 1 5-32 inches diameter; one with 1,980 cubic inches capacity running at the same speed and discharging through a nozzle 1½ inches diameter maintained a pressure of 1½ pounds, and a blower with 5,346 cubic inches capacity running at the same speed and discharging through a 2-inch nozzle maintained a pressure of 1½ pounds. In each case the nozzle was placed at the end of a short, straight pipe larger in diameter than the nozzle and the gauge was applied close to the blower.—[American Machinist.

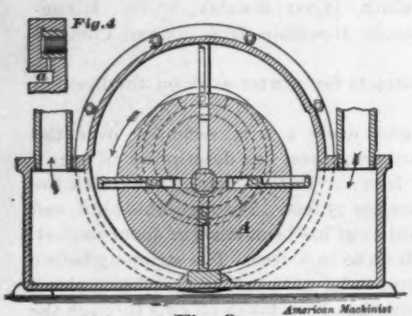
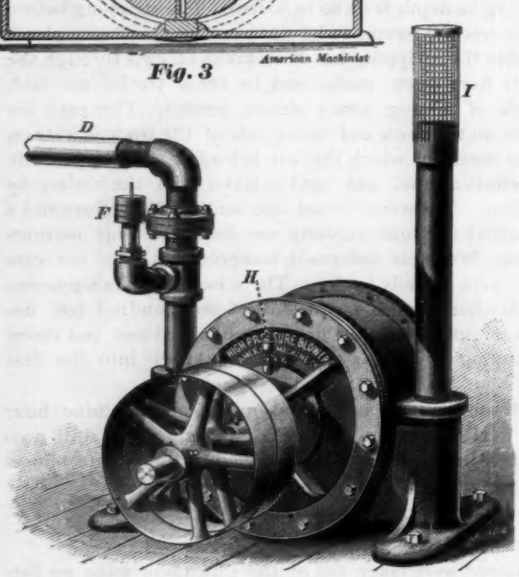
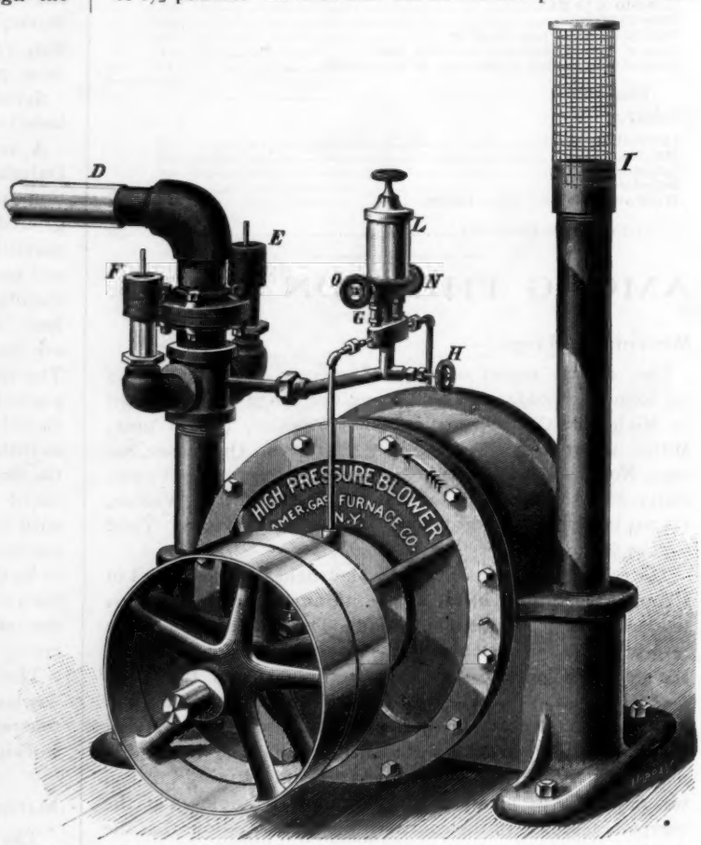


Fig. 3





ROTARY FORCE BLAST BLOWER.

Strikes and Low Prices Shut Out Profits.

The difficulties that the steel trade has had to overcome during the past year may be illustrated by the experience of the Steel Co. of Scotland—one of the largest firms engaged in the open-hearth trade. At one of their works, owing to a strike, no work was done for 14 weeks out of the 52, and at another establishment 12 weeks were lost at one department, and six weeks at the rest of the works. Besides these losses of time, and consequently of the chance of making profit, or paying interest on standing charges, the company had to fight with prices so low that they were described as the lowest that had ever been known. This is more than enough to explain the fall that has occurred in both profits and dividends. The fact is that as things have been going on lately it seems to be an achievement to be able to keep works employed at all. I cannot estimate the exact amount of the depreciation in prop-properties of this description, but the total must run into a good many millions.—[London Iron and Coal Trades Review.

RIEDLER AIR COMPRESSOR.

The Riedler system of air compressors, which has been used in Europe for a long time, has been only recently introduced in the United States. The first experiments were made in Europe by Prof. Riedler in 1883 with large Bessemer blowing engines and since 1885 with large air compressors, resulting in the present improved type of compressor. The system has been introduced with success for air compressing plants in mines and in city systems for pneumatic power distribution.

Fig. 1 shows a compound Riedler air compressor with a compound condensing Corliss engine, illustrating the standard vertical type of Riedler compressors or blowing engines for air or gas. This vertical type is used where the ground is not stable enough to assure the permanence of the long foundation blocks required by horizontal engines, or where there is at disposal only a limited space.

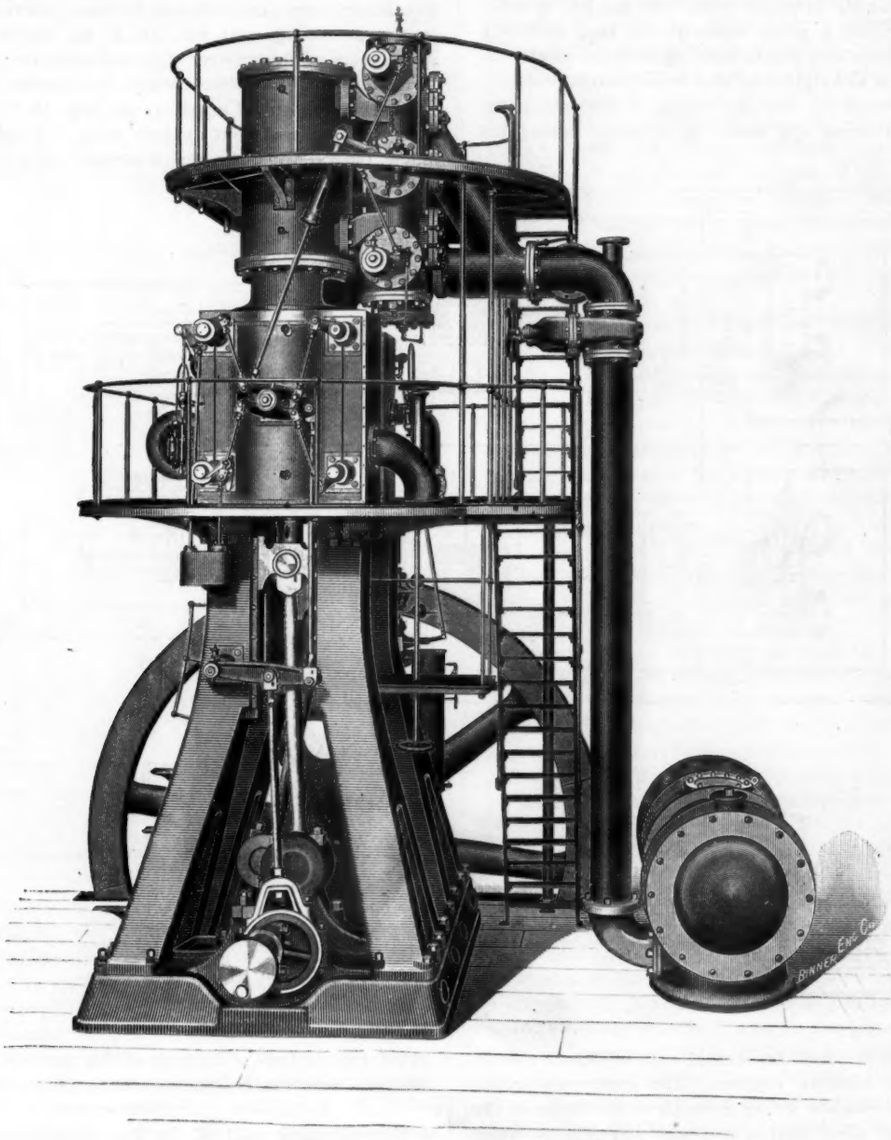


FIG. 1—RIEDLER AIR COMPRESSOR—Vertical Type.

The bed-plate contains four largely-dimensioned crank-shaft bearings, shafts and bearings being so concentrically fitted, and so secure and permanent in position as to occasion the least possible loss by friction. Upon this bed-plate are placed two pair of cast-iron columns correctly connecting the bed-plate with the steam cylinders so that the compressor can be run with as high velocity as the horizontal compressors. The air cylinders are fitted upon the steam cylinders with cast iron connecting pieces, which permit the re-packing of the stuffing boxes. The steam cylinders are of the compound Corliss type, steam-jacketed, and of the best design in every respect.

The compressors work to the compound system, giving about fifteen per cent. higher duty than twin compressors. A further benefit of the compound system is given in the reduction of the maximum stress. The volumetric efficiency is greater, because the compressed air in the clearance spaces of cylinders does not need to expand so much, thus reaching the suction pressure more quickly. A further feature is the lower mean temperature in both cylinders, the suctioned air always being cool, and its temperature not being increased as much as in simple compressors.

The compressor is built with Riedler's mechanically-geared valves, which allow the least maximum velocity and the straightest ways for the air. The dimensions of the valves are proportioned to avoid heating, or increase and decrease of pressure respectively by throttling. The valves are placed in a special cylindrical valve chamber to one side of the compressing cylinders, making them accessible and changeable in the shortest time.

The general idea is to permit the automatic free opening without any resistance as soon as the pressure in the compressor is the same as in the suction or the delivery chambers respectively, and to close it by a mechanical gearing. The makers give these reasons for not opening the valves mechanically: First, it is impossible to always open the valve (whether poppet, slide or Corliss), by mechanism at the moment when the proper pressure is reached, because the conditions are always changing. This pressure depends on the temperature of air and cooling water, the pressure of air in the suction and delivery pipes, air consumption, and other conditions too complex to be satisfied by mechanical gearing. Secondly, the mechanical opening of the valves can be done very slowly, as it depends on eccentric movement. This is very unfavorable, since the discharge valve must be opened

near mid stroke when the pistons are at their highest speed. On this account the cards of all slide-valve or Corliss-valve air compressors show a great deal of lost work by overpressure during the delivery period. Devices with releasing arrangements for a quicker opening are too complicated to be adapted to general practical use. A very simple feature of the standard Riedler valves permits of giving a very light weight to that part of the valve which must be moved by a certain overpressure of the air. The valve is made of two parts, the valve-body, or catcher, and the loose valve ring. The catcher is connected with mechanism by which it is moved positively, and guides and limits the movement of the loose valve ring. This valve ring, the seating part of the valve, is constructed of the best material and is very thin, remaining pressed against the valve seat by the air pressure when the catcher is withdrawn by the gear. At a given moment the ring suddenly lifts, opening the valve and places itself against the catcher to be re-closed again at the right time and in the correct manner. This closing is effected by gear according to the decreasing piston velocity, allowing the same air velocity during the whole period.

The manufacturers are Fraser & Chalmers, Chicago and London. Their catalogue No. 46 is devoted entirely to descriptions and illustrations of their compressors.

Lessened Puddling in England.

The production of puddled bar in the United Kingdom, in 1892, according to *Engineering*, was 173,205 tons less than in the previous year, a decrease equal to about 10 per cent., the total having been 1,560,697 tons, instead of 1,733,902 tons, as in the previous year. South Staffordshire and Worcestershire make about a third of the total, yet their output is fairly well maintained, the reduction being only about 5 per cent., while Cleveland, the next largest producing center, has a decline equal to 32 per cent., due undoubtedly to labor difficulties. Scotland comes next with 216,516 tons, practically the same as in the preceding year, but this is far below the average of some years of prosperity. Lancashire, with a total of 214,084 tons, has increased her output fractionally, the only other increase being one of nearly 25 per cent. by Shropshire, which last year turned out 51,828 tons. North Staffordshire made 158,828 tons, showing a decrease of 6.8 per cent.; Yorkshire, 130,652 tons, a decrease of 8.4 per cent.; and the other districts have lessened their make in even greater ratios.

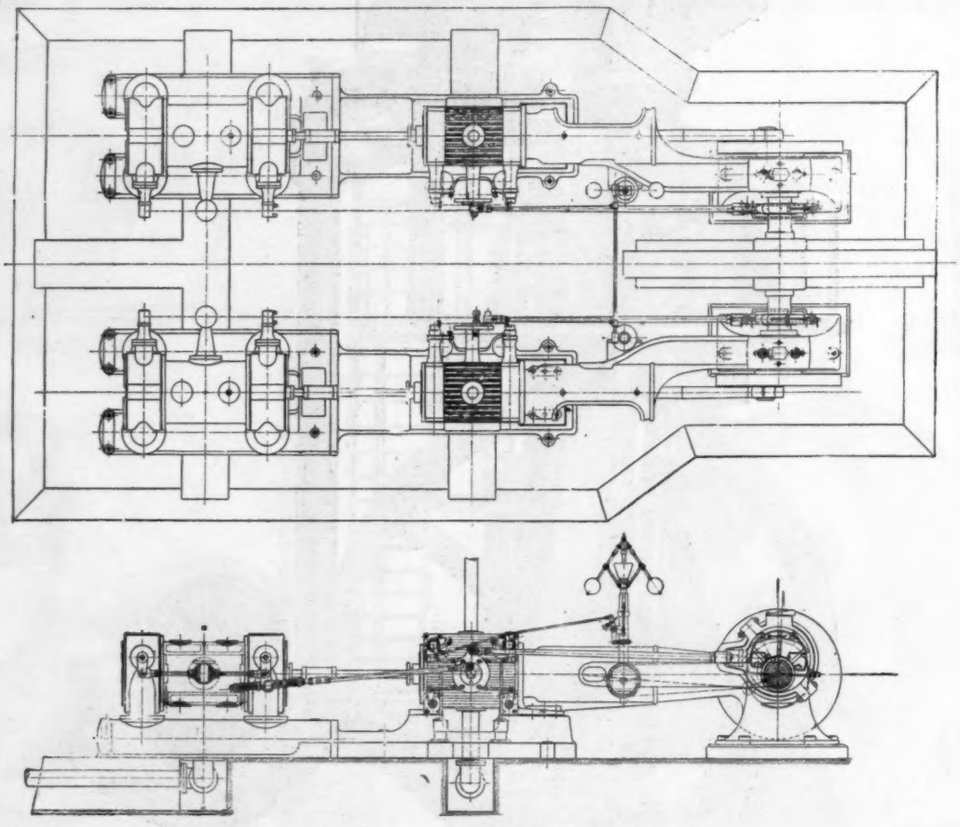


FIG. 2—RIEDLER AIR COMPRESSOR—Horizontal Type.

Fig. 2 shows the standard horizontal type of Riedler air or gas compressors or blowing engines. The compressor cylinder is put upon a bed plate going through to the frame of the engine. There is, also, ample size and strength in main bearings and in other parts exposed to wear. To keep down the temperature during the compressing period, the air cylinders are provided with water jackets. The fact that the heating of air under high compression may occasion trouble at the stuffing boxes led to the providing of large water jackets encircling the stuffing boxes, to cool both the boxes of piston rods and valve stems and the air in the valve chambers.

If the air or gas to be compressed is very impure, so as to cause a fouling of the valve seats, in course of time allowing the air to pass through, the makers give special details to the covers, and to the means of securing the valves for reducing to a minimum the time necessary to change them. The clearance space has been reduced in this compressor to a very small percentage, and the very small quantity of compressed air filling the clearance space involves no loss of work. For the sake of appearance and to save piping the bed-plate is used as air pipe, one side as delivery, the other as suction pipe. The connections with the main pipes are in accessible channels.

THE fish plate mill of the Bay View plant of the Illinois Steel Co., at Milwaukee, started up last Monday, giving employment to between 200 and 300 men. In speaking of the prospects for the future, Manager Hinton, of the Bay View mills, said there were good chances that the entire plant, blast furnaces and mills would be in operation within a few weeks. The mills, it is expected, will start on orders which will keep them busy for several weeks, and before that time has expired it is believed business will have improved so as to allow the mills to be kept in continual operation.

MR. GEO. H. ELLIS, formerly chemist for Wm. Deering & Co., of Chicago, has just purchased the business of Manns & Tartarian, analytical and consulting chemists, and will conduct their laboratory in their old office, 103-105 Metropolitan Block, 163 Randolph st., Chicago. Mr. Ellis is especially well equipped for malleable work, having devoted a great deal of his time recently to the study of this branch of the foundry business. He is also capable of handling general foundry work, and will undoubtedly score a success in his new venture.

CONDITION OF BLAST FURNACES OF U. S.*

October 1, 1893.

Location of Furnaces.	Charcoal.					Bituminous or Coke.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New England	13	4	382	9	767	.....	.....	.....	.....	.....
New York	6	0	0	6	725	7	0	0	7	6941
Pennsylvania	14	2	100	12	1047	5	0	0	5	3686
Pittsburgh	.....	.....	.....	.....	.....	24	15	25375	9	13936
Spiegel	.....	.....	.....	.....	.....	2	0	0	2	1594
Shenango Valley	.....	.....	.....	.....	.....	15	1	700	14	13297
Jun. and Con. Vals.	.....	.....	.....	.....	.....	17	3	1679	14	9028
Maryland	6	2	292	4	368	5	2	2850	3	2984
Virginia	7	0	0	7	493	23	9	5788	14	7616
North Carolina	.....	.....	.....	.....	.....	1	0	0	1	95
West Virginia	.....	.....	.....	.....	.....	4	0	0	4	3013
Ohio—Mahoning Val.	.....	.....	.....	.....	.....	12	3	4003	9	9920
East, Cent. & North.	.....	.....	.....	.....	.....	17	4	4202	13	12387
Hocking Valley	.....	.....	.....	.....	.....	12	0	0	12	3441
Hanging Rock	11	6	476	5	412	13	2	344	11	2661
Kentucky	3	1	63	2	773	6	0	0	6	2695
Tennessee	8	3	988	5	1326	13	2	1444	11	6278
Georgia	4	1	245	3	474	2	1	615	1	742
Alabama	13	4	1153	9	1918	38	10	8158	28	18046
Indiana	.....	.....	.....	.....	.....	2	0	0	2	275
Illinois	.....	.....	.....	.....	.....	19	0	0	19	24725
Michigan	21	3	1063	18	4820	.....	.....	.....	.....	.....
Wisconsin	4	1	743	3	768	4	0	0	4	2994
Minnesota	.....	.....	.....	.....	.....	1	0	0	1	665
Missouri	2	1	340	1	326	3	0	0	3	2278
Texas	4	0	0	4	1004	.....	.....	.....	.....	.....
Oregon	1	0	0	1	279	.....	.....	.....	.....	.....
Colorado	.....	.....	.....	.....	.....	3	1	754	2	1084
Total char. and coke.	117	28	5845	89	15500	248	53	55911	195	150381
Total anthracite	146	35	15578	111	45300	.....	.....	.....	.....	.....

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	28	28	44	5,845	6,298	9,747	89	89	15,500	15,233
Anthracite	35	43	70	15,578	20,006	29,655	111	105	45,300	41,396
Bituminous	53	55	128	55,911	57,177	122,156	195	193	150,381	145,864
Total	116	126	242	77,334	83,481	161,558	395	387	211,181	202,493

*The above table is condensed from the *American Manufacturer*. The tables of the *Iron Age* show in blast Oct. 1, 28 charcoal furnaces, with 5,496 tons weekly capacity; 34 anthracite, with 15,338 tons weekly capacity, and 52 coke, with 53,061 tons weekly capacity. Total, 114 active furnaces, instead of 116, as above; total capacity, 73,895 tons, instead of 77,334.

The Foos Mfg. Co., of Springfield, O., were awarded three first medals at the World's Columbian Exposition, at Chicago, on crushing mills, attrition mills and safety device; the latter applying especially to feed mills. The exhibit of the company was a very creditable one and they are to be congratulated on their success.

THE Carnegie Steel Co. is reported to have taken another important step in organization, by making P. R. Dillon general manager of their mills. He has been purchasing agent for the company for some time and superintendent of the Thirty-third Street mill.

A large force of men have been at work on Furnace A, Edgar Thomson, to get it ready to go into blast. A general resumption has taken place at the steel works.

THE Riverside Iron & Steel Co., of Wheeling, has put its new mill into operation, giving employment to several hundred men.

THE steel department of the Sligo mill has been put into operation, giving work to 85 men. Over 700 men applied.

THE boiler works of W. B. Pollock & Co. at Youngstown, O., have resumed operations.

EMPLOYES of the New Castle Wire Nail mill have accepted the 10 per cent. reduction.

MACHINE SHOP AND FOUNDRY.

EXPERIMENTS IN MELTING IRON.

Dr. Edward Kirk, of Philadelphia, sends us the following interesting appendix to his address on Cupola Fluxes, delivered before the Foundrymen's Association, at Philadelphia, and printed in these columns last week:

In 1873, when engaged in the manufacture of malleable iron, I began experimenting with mineral and chemical materials with the view of making a cheap malleable iron, and changing the nature of iron in a cupola furnace so that it might be annealed at a less cost, and produce a stronger iron. In this I succeeded to some extent and then drifted off into improving the quality of iron in a cupola for grey iron castings; this I have followed for nearly twenty years. During this time I have melted iron in foundries all over the greater part of the United States and Canada, and have constructed and worked a number of experimental cupolas of my own, to learn the effect of different mineral and chemical substances upon iron and cupola linings. In these investigations I have used all the mineral and chemical fluxes known to metallurgical science, and observed their effect upon the various grades of iron employed for foundry work.

In these experiments I have found that iron can be improved or injured when melted in a cupola furnace, and is often ruined as a foundry iron by improper melting and fluxing. The point at which iron is melted in a cupola has a great deal to do with its quality. Iron melted too high in a cupola is burned and hardened; melted too low, it runs dirty in a mould; melted with too strong a blast it is hardened. Iron melted dull does not make a sound casting. Iron melted with poor coal or coke is injured by the impurities in the fuel. Iron melted with oyster shells, limestone and other mineral fluxes may take up oxides, sulphides, phosphides, silicates and other impurities contained in the flux and be ruined by them for foundry work.

The per cent. of iron lost in melting is increased by improper melting and fluxing and may be double or treble what it should be. I have made a great many experiments to ascertain the effect of silicon on iron and have found that silicon enters freely into combination with cast iron and has a softening effect upon it. Iron as hard as tempered steel may be made as soft as lead by combining it with silicon. But silicon is an impurity having a deleterious effect upon iron. An excess of silicon destroys cohesive force and crystallization and reduces transverse and tensile strength. So great is the destruction of cohesive force in cast iron by silicon that the strongest iron may be reduced to a powder when combined with an excess of silicon. Silicon in any proportion is a detriment to cast iron, as an iron. The nature and form of crystallization of a pure cast iron is changed by sudden cooling in a mould and a soft iron in the pig may become a hard iron in a casting. This chilling property in cast iron is destroyed by silicon and an iron high in silicon is not hardened when run into a sand mould or upon an iron chill. The destruction of the chilling tendency in cast iron is very desirable in the manufacture of light castings and for this reason silicon irons are largely used in foundries making this class of work.

The per cent. of silicon an iron may contain and yet retain sufficient cohesive force for the work, depends upon the amount of other impurities in the iron and the work the iron is employed to make. For heavy work, requiring great strength, it should contain none at all. For light machinery it may contain from one-half to one per cent. and for stove plate, light bench work, etc., it may contain from two to three per cent. This amount is sufficient to reduce the chilling tendency of the iron without impairing its strength to any great extent in this class of work. But a larger amount destroys the strength of the iron and also injures its flowing property in a mould.

At the present time there is a large amount of high silicon cheap Southern iron being used in stove foundries for the purpose of making a cheap mixture and a soft casting. At one of these froundries I recently visited, the foreman in-

formed me that they were using a mixture that cost $14 per ton, and said their breakage in the tumbling barrels and mounting shop was very large and he never made a shipment to their warehouse in New York, a distance of 25 miles, but a lot of stoves were broken in transit and sent back to be remounted and repaired.

At another stove foundry in Troy, N. Y., they informed me they were using a mixture of Pennsylvania irons that cost them $20 per ton. They had scarcely any breakage at their works and shipped their lightest stoves and plate to their warehouse in Chicago without boxing or crating and never had any breakage in transit or in handling. They had found by experience that a mixture of Pennsylvania irons at a cost of $20 per ton, was cheaper in the long run than a mixture of cheap Southern irons at $14 per ton.

In a number of other foundries I visited they all complained of heavy breakage when using high silicon irons as softeners. Another matter to be considered in using these high silicon irons for stove plate, is, how long will a stove last made of such weak iron, and can a reputation for good work be maintained by froundries using them? A stove made of this kind of iron will certainly not last as long as one made of good iron.

Carbon has the same effect upon cast iron as silicon, in softening and reducing the chilling tendency. The hardest of cast iron can be made the softest by the addition of carbon without destroying its cohesive force and rendering it brittle or rotten and carbon can be added to iron in a cupola as readily as silicon. Before the high silicon Southern irons were put upon the Northern market, highly carbonized irons were used as softeners for stove plate and other light work, and a far better grade of castings were made then than is now made from the silicon irons.

It is difficult to remove silicon from iron when melted in a cupola, but free carbon is readily removed by the oxidizing flame in a cupola produced by a strong and large volume of blast; and a soft iron may be hardened in melting to such an extent as to make it unfit for the work. This can be prevented to some extent by using a mild blast and melting the iron low in the cupola, and it can also be prevented by the use of chemicals in the cupola to produce a carbonizing flame.

I have spent a great deal of time and money in experimenting on the production of such a flame in a cupola, as would not only prevent the deterioration of iron in melting, but would improve its quality, and at the present time I am engaged in the manufacture of a chemical compound for this purpose.

IN MACHINERY HALL.

The Magnolia Metal Co.

The exhibit of the Magnolia Metal Co., of 74 Cortland st., New York, is composed of their Magnolia Metal for use in machinery bearings. To show how special bearings are ordered a novel method is used. Blue prints and illustrated circulars covering these points are shown under large plates of glass on tables, making them easy of inspection. In glass cases are shown many specimens of bearings, which have been in long use, among them being a steamship bearing taken from the shaft of one of the Oriental Steamship Co.'s vessels, where it was in steady use from 1887 to 1893. In this there is almost no perceptible wear. Samples are also shown of Magnolia bearings in good condition, compared with bearings of other metals run in competition with them. Stress is placed upon the exclusive use of these bearings on the steamer "City of Paris," and other vessels of the American line, as well as on many other ships in the transatlantic service. This metal is also used exclusively on the fine passenger vessel "Manitou," recently built for the Lake Superior and Lake Michigan service by the Chicogo Shipbuilding Co. The exhibit of the Magnolia Metal Co. is at column E, 53, in Machinery Hall.

Otto Gas Engine Works.

A large exhibit of engines is made by the Otto Gas Engine Works, Thirty-third and Walnut sts., Philadelphia, and 245 Lake st., Chicago, at H, 31, Machinery Hall. There are ten engines exhibited, of which one 100 h. p., one 50, one 16, two 7 and one 1 h. p. are in operation. The others, one 15, one 2, and one ⅓ horse-power gas engines, and one 17 h. p. gasoline engine, are shown idle. These engines are so arranged as to run with an electric spark or tube igniter, as preferred. In the exhibit both methods are shown. The tube igniter has patent controlled valves which regulate the time of ignition, prevent premature firing, and thus avoid starting backward. The electric igniter is also a patent device, and is not, as formerly a perishable part of the machine. By an automatic arrangement the batteries are cut out every time the engine is stopped, and are thus protected against running out while the engine is standing. The 50 h. p. engine has a self starting attachment, which is a hand pump by which a mixture of air and gas is let into the receiver, whence it passes into the cylinder and starts the engine without hand-power on the flywheel. The gasoline engines are for use in localities where gas can not be obtained. One gallon of gasoline per horse-power will run an Otto engine for ten hours.

Otto gas and gasoline engines are also shown in the German division of Machinery Hall, and a 17 h. p. portable gasoline engine is shown in the Agricultural Building.

ON THE EDITORIAL TABLE.

The Lukens Iron & Steel Co., of Coatesville, Pa., have regarded use, convenience and pleasing typography in the handy book they have recently presented to the trade It is bound in flexible red leather and in paper, type and illustration is exceptionally clear and handsome. As a frontispiece an engraving is given of the firm's original mill, established in 1810, in which the first boiler plates were made in the United States. The pages following are devoted to the boiler plate and other work done at Coatesville, the sizes of plates and heads being tabulated and special pages are given to their machine flanged boiler heads and flue holes, directions for ordering flanged work, the Lukens manhole, the Lukens manhole saddle, weights of steel and iron per square foot, weights of circular plates of given diameter and thickness, etc. Under the head of "Useful Information" an interesting collection of facts valuable to steam users is brought together. Stress is laid by the compilers on the elaborate code presented in the book, for the economic transmission of messages relating to steel plates. The Lukens Iron & Steel Co. have agencies in the principal cities of the country. In Cleveland they are represented by J. F. Corlett, 201 Western Reserve Building, and in Chicago by the Scully Steel & Iron Co.

J. W. Penfield & Son, of Willoughby, O., send us a neat brochure on their Imperial friction clutch, which was illustrated and described in these columns some time ago. They send descriptive circular and price list for the asking.

It is not to be expected that the October number of the *Cosmopolitan* will have the success attending that for September. After 211,000 copies of the latter had been sold, the news company had orders for 50,000 more than they could supply, while dealers who found the edition rapidly going raised their prices from 12½ cents to 50 and 75 cents. It is expected to make the December issue 300,000.

Bright and original *Dixie* sends the compliments of the cotton-picking season to its friends, in the form of a ball of cotton, as nature made it. Attached to the stem is a card bearing this cheerful message, that has anything but a "hard times" ring: "The darkies are singing in the cotton fields the country is noisy with the hum of gins; wagons piled up high with bales of the fleecy staple are rolling into the towns and hamlets and train load after train load is coming into our cities. All the land is glad and smiling, and with good reason. The crop is good and prices are high and still advancing. This means that nearly $400,000,000 will pour into the South in the next few months. Why shouldn't the people be happy in the light of this prospect?"

In *Lippincott's* for November, Lewis M. Haupt discusses "Progress in Local Transportation;" Milton Tournier tells "Why the Body Should be Cultivated," and there are the usual number of short stories and sketches. The complete novel is "An Unsatisfactory Lover" by "The Duchess."

RECEIVERSHIP asked, for the New Albany (Ind.) Steam Forge & Rolling Mill Co.

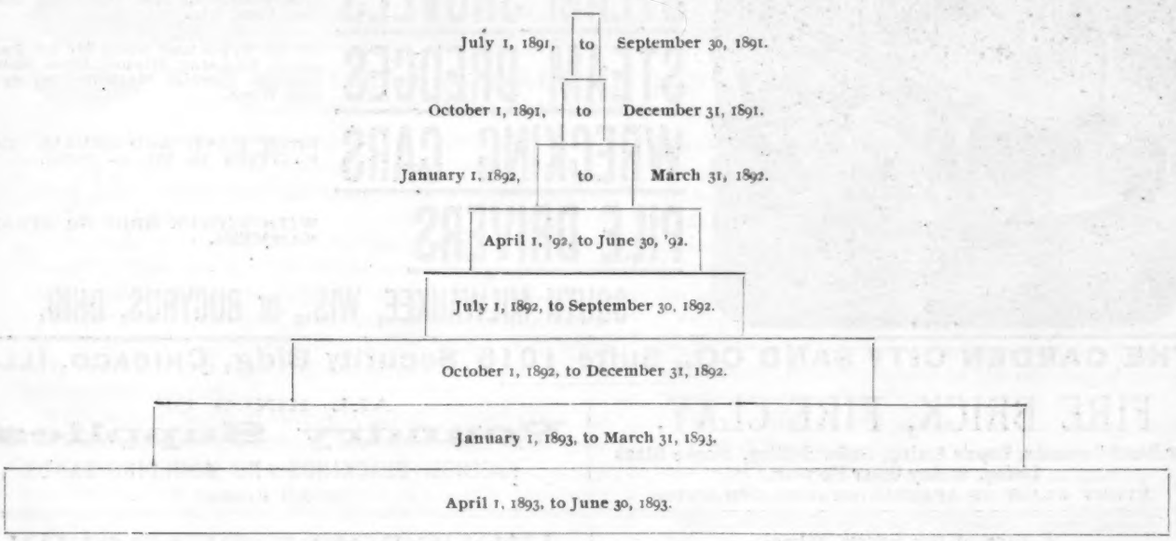
TWO YEARS OF AMERICAN TIN PLATE.

The *Bulletin* of the American Iron and Steel Association prints the following table, showing our production of tin plates and terne plates by quarters during the two fiscal years ending June 30, 1893, from the official statistics furnished by Col. Ira Ayer, the special agent of the Treasury Department:

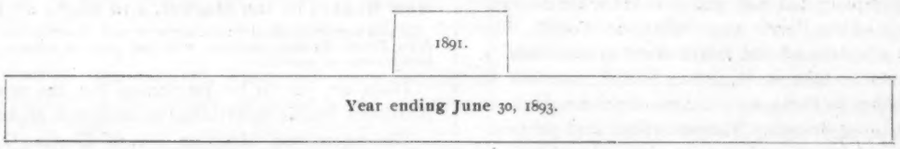
Production by quarters.	Pounds.
July 1, 1891, to September 30, 1891	826,922
October 1, 1891, to December 31, 1891	1,409,821
January 1, 1892, to March 31, 1892	3,209 225
April 1, 1892, to June 30, 1892	8,200,751
July 1, 1892, to September 30, 1892	10 952,725
October 1, 1892, to December 31, 1892	19,756 491
January 1, 1893, to March 31, 1893	29,566,399
April 1, 1893, to June 30, 1893	39,543,587
Total for first year	13,646,719
Total for second year	99,819,202
Total for both years	113,465,921

The production by quarters is drawn graphically by the *American Economist* in the pyramid below.

The *Economist* comments: It will be noticed, from an inspection of the above figures, that for the second year the make was 631.4 per cent., or almost 7⅓ times greater than for the first year; and that from April 1 to June 30, 1893, the average make per mouth was about as great as the output of the entire year ending with June 30, 1892.


July 1, 1891, to September 30, 1891.
October 1, 1891, to December 31, 1891.
January 1, 1892, to March 31, 1892.
April 1, '92, to June 30, '92.
July 1, 1892, to September 30, 1892.
October 1, 1892, to December 31, 1892.
January 1, 1893, to March 31, 1893.
April 1, 1893, to June 30, 1893.

The production by years is also delineated on a smaller scale:



Few industries can show such a gratifying development. Our steel rail production did not even approximate this increase. In 1867 our make of Bessemer steel rails was 2,277 tons, and in the next year 6,451 tons, or less than three times as much as in the first year. Our tin-plate industry, on the contrary, was a sizable infant the first year, with 6,092 gross tons, growing to a 44,115 ton boy in the next.

This wonderful growth has been made in the face of the most general, stupendous and shameless mendacity that the world has ever seen. Surprise has often been expressed that the opposition to the establishment of a tin plate industry here was so much greater than to the establishment of the Bessemer steel industry. There are two reasons for this: The Welsh monopolists have been for some time distributing a portion of the shares for new tin works in the country, a precaution that the English rail makers did not take. And the entire loss of trade with this country in steel rails has taught both the English manufacturers and their agents here, the importers, an impressive lesson.

The 113,465,921 pounds of tin and terne plates manufactured in this country during the two years in which the McKinley tariff has been operative have been effective not only in reducing the profits of the Welsh monopolists, but also in furnishing employment to labor in this country, with its consequent market to our farmers, and reducing the amount of gold that could be called out of this country in payment of foreign indebtedness.

Amalgamated President on the Mill Situation.

President Garland, of the Amalgamated Association, visited Youngstown last Friday. In answer to the question whether matters were improving at other points he said: "No, I can't say that they are. Although the scale has been signed, yet it does not seem to give a great impetus to the iron business. Some mills are running half time, others a few days at a time, while some have not started."

"What are the prospects?"

"Well, it can only be compared to the weather. It may rain or the sun shine."

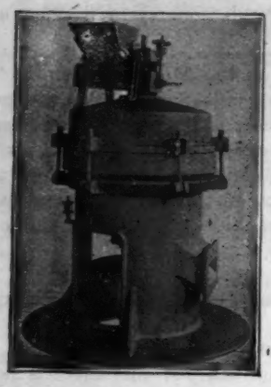
"When will the mills here be started?"

"That I cannot answer. I am satisfied that there is no disposition among the mill owners to run non-union. If trade brightens up the fires will be lighted in a short time. Mill owners tell me that they have no orders to run on, and I believe them."

A New Phase in the Wire Nail Situation.

Since the introduction of the wire nail it has been steadily gaining ground at the expense of the steel cut nail, and it seemed that ultimately it would almost entirely supplant the latter. Recently, however, several facts have turned up which cast a new light on the situation, and seem to indicate that for certain purposes the steel cut nail will always be used. It will be remembered that one of the claims of the wire nail was its holding power, and it must be a matter of surprise to many to find that many builders state that it does not begin to hold nearly as well as the steel cut nail. They say it is too smooth, and if a board be warped or springy, it pulls the wire nail right out, whereas the steel cut nail, being rough and having usually a feather edge, will hold just as well in dry wood as in any other kind. The result is that in certain sections where the steel cut nail was losing the most ground it is now regaining some of it, and it will be interesting to note the final settlement of this question.—[Age of Steel.

WILLIAM MARTIN, for a number of years secretary of the Amalgamated Association of Iron and Steel Workers, but who has for the past two years been connected with the Carnegie Steel Co., Limited, has severed his connection with that company. The position filled by Mr. Martin, which included looking after the labor interests of the company, has been abolished.



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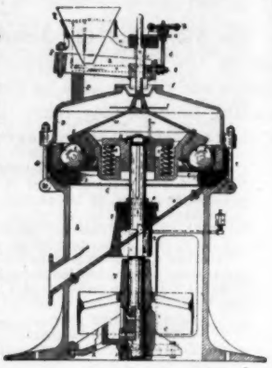

Bucyrus Steam Shovel & Dredge Co.,

—MAKERS OF—

STEAM SHOVELS — In Five Sizes for Railroad and Contract Work, Brick Yards, Stone Quarries, Stripping and Handling Iron Ore, Coal, Etc.

STEAM DREDGES — Of All Types and Sizes; for All Purposes; Elevator, Dipper, Clam Shell, Suction. Special Machines for Special Work.

WRECKING CARS — BOTH HAND AND STEAM. CAPACITIES 10 TO 35 TONS.

PILE DRIVERS — WITH EITHER DROP OR STEAM HAMMERS.

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FIRE BRICK, FIRE CLAY,

For Blast Furnaces, Cupola Lining, Boiler Setting, Smoke Stack Lining, or Any Other Purpose.

EVERY CLASS OF SPECIAL SHAPES AND SIZES.

ALL KINDS OF

Foundry Supplies.

FACINGS, BLACKINGS AND MOULDING SANDS

Of All Kinds.

Future of the Ferris Wheel.

Mr. G. W. Ferris said a few days ago to a Pittsburg *Dispatch* reporter that his company had not yet decided what disposition would be made of the Ferris wheel after the World's Fair closes. People in all parts of the world want to purchase it. One company wants to take it to Coney Island; another to London, Eng.; another to Paris, and still another one wants to erect the wheel in Long Branch. Various offers and propositions of all sorts are pouring in every day. According to contract the big wheel will have to be removed from Midway within 60 days after the Columbian Exposition closes. The work of taking it apart will be enormous, and the company will need all of that time to complete the task. The wheel has proved a profitable investment for all concerned. Mr. Ferris said it was possible that the company would not sell the wheel, but erect it at some watering place.

WE have just received a letter from the Hon. George H. Ely, of Cleveland, from which we venture to take the following pertinent references to the present business situation: "The country is waiting on Congress both as to silver and tariff legislation. What else can it do? Meantime we are losing, and for how long no man can tell, the natural results of the nation's labor and capital in production. All this because the political necessities of the Administration compel the attempt to destroy an economic system that has builded and crowned us with power. What may be visible and can be gathered hereafter into statistics as to this arrest of progress the world will know, but there will be no utterance that the world can listen to from the lowly homes into which pain and suffering will come from this forcing upon us of foreign labor and social conditions through this alleged reform of the tariff."—[Bulletin.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

Tools are yet to be purchased for the new car shop the Northern Pacific is building at Brainerd, Minn.

The enterprise Machine Co., of Elyria., O., capital stock, $10,000, has been chartered for manufacturing and repairing all kinds of machinery, conducting foundry, etc.

The Pittsburg Tool Steel Co., Pittsburg, Pa., capital stock $100,000, has been incorporated for the purpose of manufacturing iron and steel and articles of commerce therefrom. D. H. Summers, 72 Twenty-fourth street, Pittsburg, Pa., is treasurer.

At the office of the supervising architect, Washington, D. C., sealed proposals will be received until 2 P. M., Oct. 31, 1893, for all the labor and materials required for the extension of the low pressure steam heating and ventilating apparatus, re-constructing part of the old apparatus and for furnishing new power boiler for the U. S. Court House and Postoffice building at Dallas, Tex.

New Construction:—

At the Edgar Thomson Steel Works at Braddock, Pa., a readjustment of wages not governed by the scale has been made.

The Sharon Boiler Works, of Sharon, Pa., is building a new cupola for the Top Mill blast furnace of the Wheeling Iron & Steel Co.

The W. H. Page Boiler Co., of Norwich, Conn., have plans for a new foundry, which they propose to build to accommodate increasing business.

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

GOVERNMENT ⁂ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Alleganv Countv, Md.

Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Lewis Block, Pittsburgh, Pa.

THE WHITMAN & BARNES MFG. CO.,
Manufacturers of DIAMOND BRAND TWIST DRILLS.

FACTORIES AT
Akron, O.; Syracuse, N. Y.; Canton, O.;
St. Catharines, Ont.
STORES AND WAREHOUSES AT
Boston, Mass.; New York, N. Y.; Philadelphia, Pa., Cincinnati, O.; Chicago, Ill.; Kansas City, Mo.; San Francisco, Cal.; London, Eng.; Paris, France.

A new foundry is being erected for the Asheboro (N. C.) Wood & Iron Works and will be equipped with new boilers, engines and other machinery.

The walls of the car shop for the Northern Pacific, at Brainerd, Minn., are up ready for the roof. It is probable that further additions to these shops will be made next season.

The Bryden Horse Shoe Co., of Catasauqua, Pa., have begun the erection of a stockhouse 60x114 feet, with a wing 20x24 feet, which will give them ample facilities for handling all the product they can make.

Work will be begun at once on a 20-stall round house for the Duluth, Mesabi & Northern road at Duluth. Plans have been prepared for a shop plant and it is the intention of the company to have as much of the work as possible done this fall.

The New Home Sewing Machine Co., at Orange, Mass., have placed the contract with the Berlin Iron Bridge Co., of East Berlin, Conn., for a new foundry and tumbling room. The building will be entirely of iron, 45 feet in width and 120 feet in length.

The new draw bridge at Salem, Mass., will have a 60 foot opening with a roadway 28 feet wide in the clear and two sidewalks, each 6 feet wide. It will be a deck plate girder construction. The Berlin Iron Bridge Co., of East Berlin, Conn., have received the contract.

General Industrial Notes:—

The Mt. Vernon Car Mfg. Co., of Mt. Vernon, Ill., has increased its capital stock to $200,000.

The puddling mill, old rail mill and the steel mill of the Bethlehem Iron Co. have resumed work.

The Midland Steel Co., Muncie, Ind., are still running on full time in the production of light and heavy steel sheets.

The sheet mill of the Sumner Bros. & Co.'s plant at Struthers, O., has resumed operations and furnished employment to about 100 men.

The puddling department of the Arethusa Iron Works, at New Castle, Pa., has resumed, the men having settled their differences with the company.

The Philadelphia Bridge Works, at Pottstown, Pa., which have been idle, started up on double turn on Oct. 9, contracts having been received to keep the shops busy for some time.

Singer, Nimick & Co., Pittsburg, whose mill is non-union, announce that they will pay $5 for puddling and that for the present they will pay the Amalgamated scale in their finishing department.

Several departments of the Cambria Iron Works, at Johnstown, have resumed operations again. It is said that the stockholders will be called upon in January to vote for an increase in the capital stock, as improvements costing $1,000,000 to $1,500,000 are contemplated.

At Hollidaysburg, Pa., receivers were appointed for the Juniata Mining Mfg. Co., on the petition of the Rockhill Iron & Coal Co. creditors of the concern. The liabilities are $35,000, assets $12,000.

The gigantic hydraulic forging press of the Bethlehem Iron Co., at South Bethlehem, Pa., has been started. The press has been erected in an extension to the building of the famous 125-ton steam hammer.

The blooming mill department of the Spang, Chalfant & Co.'s Steel Works has gone on double turn. This mill has been shut down for a long time and by its starting employment is given to about 100 men.

The statement is telegraphed from Pittsburg, as an indication of the diminution of mill stocks during the shut-downs, that the Dewees Wood Co. sold $375,000 worth of stocked up finished material while their mill was closed.

The Chicago Steel Works, at Chicago Heights, Ill., have been bought by Geo. D. Wick and other Youngstown capitalists and will be put in operation before the end of the year, still making a specialty of agricultural shapes.

Mackintosh, Hemphill & Co., Pittsburg, are making decided improvements in their equipment. Electric cranes are being substituted for the old jib cranes, and other improvements may be made, the work to require two or months.

The Amalgamated Association and the company have made a settlement of the trouble between he Salem Wire Nail Co. and the wire drawers in both the Salem and Findlay plants, the men going to work at the 10 per cent. reduction.

The Northwestern Malleable Iron Works, at Milwaukee, Wis., which closed down about two months ago on account of lack of orders, have resumed with a full force. It is understood that the works have a number of good sized orders on hand.

The Monongahela blast furnaces at McKeesport, Pa., were blown in Sunday evening, the stock of pig metal having been exhausted by the McKeesport works. This will give 200 men work. The new steel works adjoining the furnaces will be ready to start in a month and 400 men will be employed.

Secretary Jarrett said recently that about one-third of the plants represented in the Association of Iron and Steel Sheet Manufacturers were in operation and that it was not probable any others would be started until after another conference with the Amalgamated Association, should the latter vote to have another.

President Wick, of the Union Iron & Steel Co., Youngstown, called the office employes together last week and said that, by reason of the dull trade and little prospect of the mills starting, they would be released until further notice. The office

employes in the other mills are still on duty, but expect to be let out any day.

Damage to the extent of $5,000 was done to the works of the Windsor Locks Steel Co., at Windsor Locks, Conn., by the bursting of a 14-foot balance wheel weighing about 15 tons. The wheel was a new one and was being tested. The roof was torn off a portion of the works and a 55-foot smokestack knocked down.

The shops of the Westinghouse Air Brake Co., at Wilmerding, Pa., shut down on Oct. 5, and it is announced that they will be closed for about three weeks. Few orders for brake equipment have been received and a large stock of material has accumulated. While the shops are closed a new boiler plant is to be put in.

The works of the Gilbert Car Mfg. Co., on Green Island, N. Y., near Troy, resumed operations on Oct. 9, by an order from the court, after being closed for six weeks, or since the receivers were appointed. About 300 men are now employed. The shops are working on a contract for the Lake Street Elevated of Chicago and have 50 cars yet to build.

Stack No. 1 of the Thomas Iron Co. at Hokendauqua, Pa., which is being re-built, will be designed and equipped to make 125 tons of pig iron a day. It will be 80 feet high and have a 17-foot bosh. The old stack will be torn down, and only the stoves will be left standing for use in the new stack. The old stack was built in 1855, after the fire which destroyed the first stack built a year earlier.

Part of the force at the rolling mill at Duncansville, Pa., are out on a strike. The men working in the bar and guide mill were notified that a reduction in wages of from 15 to 35 per cent. would take place and that the company had prepared a scale of its own. The men in the two mills mentioned refused to go to work at the reduction and other employes are expected to go out when certain orders are filled.

The statement of the Michigan Peninsular Car Co. for the year ended Aug. 31, 1883, shows net earnings of $866,690, which, after paying fixed charges, including a dividend of eight per cent. on the preferred stock, leaves more than 18 per cent. profit. Eight per cent. was paid on the common stock, and a little over 10 per cent. carried to the surplus fund. The cash assets of the company amount to over $3,000,000, and the fixed assets to over $7,000,000.

The dismantling and sale piece-meal as junk, of the Vulcan Works plant at St. Louis, is the disastrous end of one of the great Bessemer steel enterprises of the country. It embraced two coke blast furnaces at St. Louis, a charcoal blast furnace at Pilot Knob and a large steel plant and rail mill at St. Louis. The steel works were built in 1875 and 1876. The eight-ton steam hammer was sold to Pittsburg parties for $6,000, when in operation the works employed 2,800 men. The big strike of 1882 ended its career.

A New Castle, Pa., dispatch says: Notice of a 10 per cent. reduction was posted Oct. 12 at the wire nail mill. The mill was started a few weeks ago at a reduced scale. Manager Stevenson claims that the later reduction is necessary in order that the mill may compete with those at Salem, where a similar reduction has been accepted. A reduction of about 10 per cent. has also been asked at the Atlantic Iron Works and at the Arethusa Iron Works.

Manager Francis Hinton, of the Bay View plant of the Illinois Steel Co., said the other day: "There is no improvement in the outlook and all the mills of the Illinois Steel Co. in other places will remain idle for an indefinite period. As to the future of the Bay View mills I cannot speak too freely. Orders are coming in slowly and for the present there is no prospect of the fish-plate mills being started up again very soon. Orders are very slow, but I think they will be of sufficient volume to keep the mills now running in active operation during the winter."

Have You Seen

The World's Fair? If not, you will always regret it. See Nickel Plate Road's Agents about one-fare rates every day, commencing Oct. 19th.

The Cleveland & Buffalo Transit Co. announce that on Monday, Oct. 9, Steamer State of New York was taken out of commission and that until further notice the Steamer State of Ohio will continue on the route, leaving Cleveland every Tuesday, Thursday and Saturday, at 7:15 P. M., arriving at Buffalo at 8 the following morning. Leaving Buffalo every Monday, Wednesday and Friday, at 7:15 P. M., the same boat will arrive at Cleveland at 8 the following morning.

Daily Excursions to the World's Fair,

Via the popular Nickel Plate Road, commencing Oct. 19th. One-fare for the round trip.

World's Fair Excursions

Will be run every day, commencing Oct. 19th, via the popular Nickel Plate Road.

The production of pig iron in Germany for the eight months ending August 31 is reported at 3,135,679 tons, a decrease of 55,509 tons, or 1.8 per cent., from the corresponding period in 1892.

CORRIGAN, IVES & CO.,
DEALERS IN
IRON ORE AND PIG IRON,
Rooms 716, 717, 718, 719 Perry-Payne Bld'g,
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Cleveland Iron Mining Co.—Iron Cliffs Co.
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Exclusive attention given to
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STEAM PUMPS
—AND—
CONDENSERS.
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One Fare Every Day

Commencing Oct. 19th and continuing until Oct. 31st, the Nickel Plate Road will sell excursion tickets to Chicago and return at rate of one-fare for the round trip. Tickets good on all trains and good returning ten days but not later than Nov. 5th, 1893.

To or From Chicago via the Lakes.

If going to Chicago and not pressed for time, take the greatest trip to the greatest fair on earth having a one-thousand-mile ride on the grandest palace steamers on the lakes, returning from Chicago all rail. If preferred, can go to Chicago all rail and return via the lakes and Detroit. Berths and meals included between Mackinac and Chicago. This trip will give very pleasing, picturesque scenery, and a refreshing, restful change. A very enjoyable trip for all to take, and will well repay doing so. Round trip rate from Cincinnati $21.30, via Toledo and boat 30 cents less. For further information as to rates from other points ask any agent on the C. H. & D. system, or address E. O. McCormick, G. P. & T. A., C. H. & D.R. R., Cincinnati, O.

The Last of the World's Fair.

The Exposition will close Oct. 31st. During the last twelve days of the World's Fair the Nickel Plate Road will run one-fare excursions every day.

THE CONDIT-FULLER CO.,

Pig and Bar Iron,

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When you write to firms advertised in our columns, please mention the fact that you took their address from our paper. They will thank you for it.

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Hot Pressed Nuts, Wrought Iron

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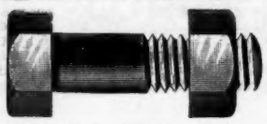

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Builders of Machinery for Hardware Manufacture.

AUTOMATIC

Wire Straightening and Cutting Machines,

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22″x12′ Fifield lathe, power cross feed.
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No. 1 Browne & Sharpe universal milling machine.
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60″ Radial drill.
No. 1 Wire feed screw machine.
No. 1 Hand miller.
11″ Enterprise shaper.
24″x6′ planer, all feeds in head.
36″x36″x10′ Pease planer complete.
Power bending rolls 8′x10″.
Heavy punch, shear and flanging clamps.
1 1-2″ Pratt & Whitney bolt cutter.
3 Spindle Garvin drill.

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ALL KINDS OF METAL WORKING MACHINERY FOR DOMESTIC AND EXPORT TRADE

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Prentiss Tool & Supply Co.
Alfred Marshall
Manager

PHILADELPHIA CORUNDUM WHEELS,

Made by the Philadelphia Emery & Corundum Wheel Co.

These Wheels are absolutely superior in all things to any Emery Wheel made. They are guaranteed to be made entirely of pure sapphire North Carolina and Georgia Corundum. They are a very free, fast cutting, open and porous, durable and lasting wheel. Will cut faster, do more work and last longer than any Emery Wheel made. Will not glaze or fill up, nor wear away too fast. Are uniform in temper, will wear even and true and not get out of balance. Will not heat tempered steel enough to draw the temper, case harden or burn it when run dry, and are one of the best wheels made for running in water. Are one of the strongest and safest wheels made, and not as liable to break as most other wheels are. Every wheel can be exactly duplicated at any time; they are sold on their merits, are sent on trial and approval, guaranteed to give entire satisfaction, and if they do not do so can be returned.

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Made of cable steel wire and cotton woven solid together, is absolutely the strongest. toughest, most powerful, flexible, durable and lasting belting made, without any exception whatever. It is stronger, tougher, more durable and willtransmit more power than the best oak tanned double leather belting made. It will not stretch or slip even when wet. It is waterproof and is not affected any by water, steam, dampness, moisture, heat, dryness, oils, grease, acids, chemicals, dust, changes of climate or weather. It will not rot, mildew, crack, or get hard or stiff. Does not require any grease or otherbelt compositions nor special care, but will always keep soft and flexible and in good condition for use. It is in price than single leather belting, and fifty to seventy-five per cent cheaper than double leather belting. It is absolutely superior to all other kinds of belting for all places where belting of any kind is used.

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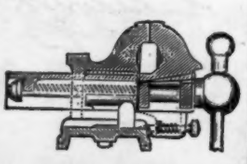

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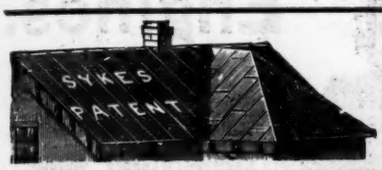

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Platform, 90" long, 27¾" wide; made of best seasoned hickory, with slat top. Weight, 350 pounds. For particulars address

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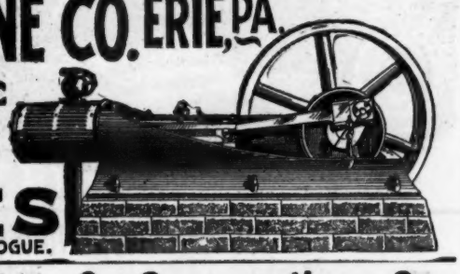

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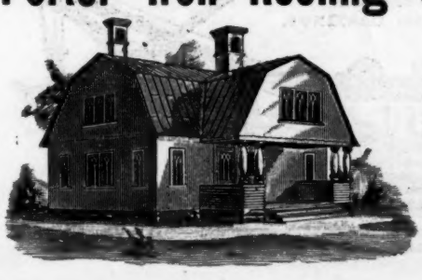

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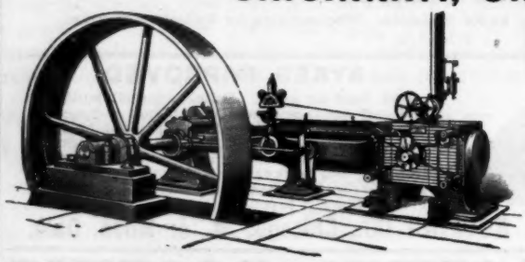

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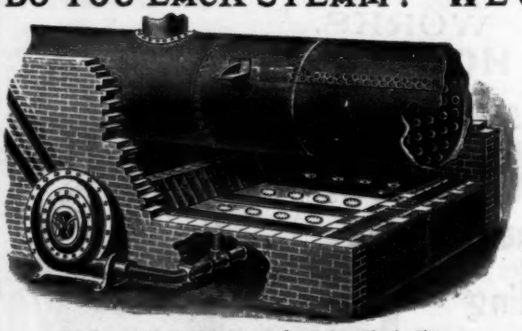

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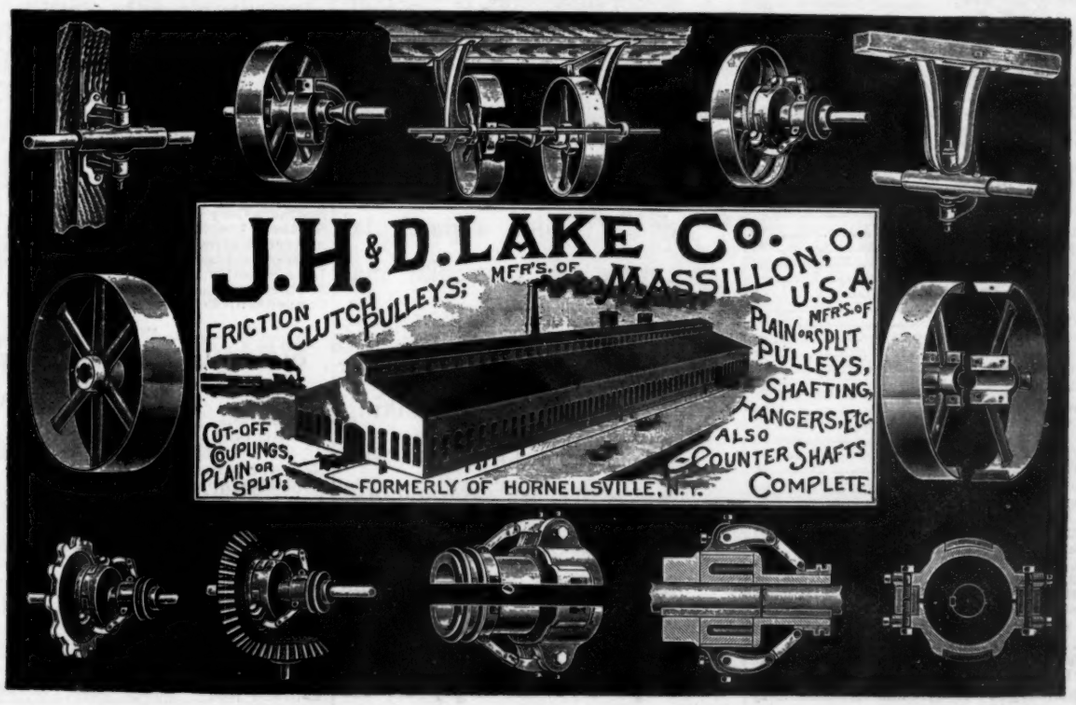
Are most cordially solicited to investigate the merits of the country reached by the Baltimore & Ohio Railroad. We sincerely believe we can demonstrate that the natural advantages, which exist along this system of railroad, cannot be obtained as a whole on any other transportation line in the world. Goods cheaply made are half is a truism, and we venture the assertion that a greater variety of factories can be operated along the Baltimore & Ohio, and at less cost for production, than any other section of the United States. We are ready to assist Manufacturers in reaping the benefits of these advantages. Correspondence solicited.

M. V. RICHARDS,
Land and Immigration Agent, B. & O. R. R.,
Baltimore, Md

ALONG THE BALTIMORE & OHIO RAILROAD.

The Advertiser who sticks to printer's ink in dull months will find trade sticking to him when the turn comes.

UNION
ELECTROTYPE
FOUNDRY
TELEPHONE 2139
829 SHERIFF ST. CLEVELAND O


J.H. & D. LAKE CO.
MFR'S. OF
MASSILLON, O. U.S.A.
FRICTION CLUTCH PULLEYS;
MFR'S. OF PLAIN OR SPLIT PULLEYS, SHAFTING, HANGERS, ETC.
ALSO COUNTER SHAFTS COMPLETE
CUT-OFF COUPLINGS, PLAIN OR SPLIT;
FORMERLY OF HORNELLSVILLE, N.Y.

Alphabetical List of Advertisers.

The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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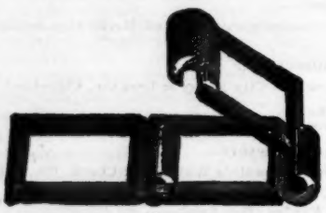
JEFFREY

Chain Belting

—ALSO—

MALLEABLE, STEEL, WROUGHT AND SPECIAL CHAINS.



FOR

ELEVATING AND CONVEYING MACHINERY

Send for 1893 catalogue and

REDUCED PRICE LIST.

THE JEFFREY MFG CO.,

143 E. First Ave., Columbus, O.

New York Branch, 163 Washington St.

PERSISTENCE

is a foremost element of success in advertising. Because the reader of an advertisement is not in a humor to buy when he sees it the first time, is not conclusive of the value of that advertisement in his case. Constant familiarity with the announcement of a particular boiler, a particular engine, a particular machine tool, brings the maker to mind when the time does come for making contracts. The men who make freest acknowledgment of their obligation to advertising are the ones who have

Kept Everlastingly at It.

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

Low Phosphorus Bessemer	$4.15@$0.00
No. 1 Specular, Bessemer	4.00@ 0.00
No. 1 Bessemer hematite	3.50@ 3.75
Hematites No. 1 non-Bessemer	2.75@ 3.25
No 1. Specular, non-Bessemer	3.00@ 3.50

PIG IRON.

CLEVELAND (f. o. b. cars):

Bessemer	$12 00@ 00 00
No. 1 Strong Foundry	12 50@ 13 00
No. 2 Strong Foundry	11 50@ 12 50
No. 1 Grey Forge, red short	11 50@ 12 75
No. 2 Gray Forge, neutral	11 25@ 11 50
No. 1 American Scotch	13 50@ 00 00
No. 2 American Scotch	12 50@ 00 00
Lake Superior Charcoal	15 00

PITTSBURGH (reported by A. H. Childs):

No. 1 Foundry	$12 50@$13 00
No. 2 Foundry	11 50@ 12 00
Grey Forge	11 00@ 11 50
White and Mottled	10 75@ 00 00
Warm Blast Charcoal	18 00@ 21 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	11 75@ 12 50

CHICAGO (reported by our representative:)

Lake Superior Charcoal	$16 00@$16 50
Local Coke Foundry No. 1	13 50@ 14 00
Local Coke Foundry No. 2	13 00@ 13 25
Local Coke Foundry No. 3	12 75@ 13 00
Local Scotch Foundry No. 1	14 00@ 14 50
Local Scotch Foundry No. 2	13 50@ 14 00
Local Scotch Foundry No. 3	13 00@ 13 50
Southern Coke No. 1	14 10@ 14 35
Southern Coke No. 2	12 35@ 12 60
Southern Coke No. 3	11 85@ 12 10
Southern No. 1 Soft	12 35@ 12 60
Southern No. 2 Soft	11 85@ 12 10
Southern Silveries No. 1	14 50
Southern Silveries No. 2	13 50
Ohio Silveries No. 1	16 50@ 17 00
Ohio Silveries No. 2	16 25@ 16 75
Ohio Strong Softeners No. 1	15 50@ 16 00
Ohio Strong Softeners No. 2	15 50@ 16 00
Tennessee Charcoal	16 00@ 16 50
Alabama Car Wheel	00 00@ 18 85

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$12 75@$13 00
Southern Coke No. 2 and No 1 Soft	11 00@ 11 25
Hanging Rock Coke, No 1	14 50@ 15 00
Hanging Rock Charcoal No. 1, Fdy	18 50@ 19 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Stone Coal No 1	15 50@ 16 00
Southern Coke, Grey Forge	10 00@ 10 25
" " Mottled	9 75@ 10 00
Standard Alabama Car Wheel	17 50@ 18 00
Tennessee " "	16 00@ 16 50
Lake Superior " "	17 00@ 17 50

BUFFALO (reported by Rogers, Brown & Co.)

Mahoning and Shenango Valley, strong, No. 1 Foundry	$13 75
Mahoning and Shenango Valley, strong, No. 2 Foundry	13 25
Ohio Softener No. 1	14 00
Ohio Softener No. 2	13 00
Jackson Co. Silvery, No. 1	$16 80@ 17 30
Jackson Co. Silvery No. 2	15 00@ 16 00
Lake Superior Charcoal	15 75
Tennessee Charcoal	16 00
Southern Softener No. 1	13 15
Alabama Car Wheel	18 00
Hanging Rock Charcoal	20 50

LOUISVILLE (reported by Geo. H. Hull & Co.)

Southern Coke No. 1 Foundry	$12 50@$13 00
Southern Coke No. 2 Foundry	11 25@ 11 75
Southern Coke No. 3 Foundry	10 75@ 11 00
Grey Forge	10 25@ 10 75
Spathite	12 00@ 12 50
Southern Charcoal No. 1 Foundry	15 00@ 16 00
Car Wheel	17 50@ 17 75

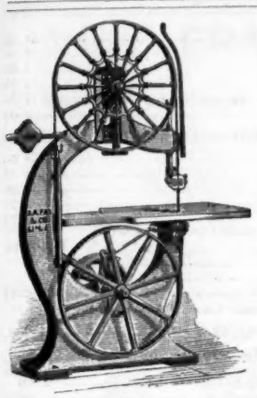
ST. LOUIS (reported by Rogers, Brown & Meacham):

Southern Coke No 1	$13 25@$13 50
Southern Coke No. 2	11 75@ 12 00
Southern Coke No. 3	11 25@ 11 50
Southern Grey Forge	10 50@ 11 00
Southern Charcoal No. 1	15 50@ 16 00
Missouri Charcoal No. 1	14 00@ 14 50
Ohio Softeners	16 50@ 17 00
Lake Superior	17 50@ 18 00
Southern	17 50@ 18 00
Connellsville Coke, St. Louis	5 00

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	GROSS TONS
Old iron rails	$18 00
Old steel rails	13 50
	NET TONS
No. 1 R. R. wrought scrap	$12 00
No. 1 wrought scrap	12 00
No. 1 Machine cast scrap	10 00
Iron axles	17 00
Axle turnings	11 00
Wrought turnings (free from cast)	9 00
Cast borings	6 50
Uncut wrought iron boilers	8 00
Steel boiler Plates	10 00
Grate bars	5 00
Pipes and flues (clean)	9 00
Tank iron	8 00
Hoop and band iron	7 00
Sheet iron	7 00
Wrought drillings	7 00
Malleable iron	8 50



BAND SAWS—TWELVE STYLES.

J. A. FAY & EGAN CO.,

251 to 271 W. Front St., CINCINNATI, OHIO.

OWNERS AND OPERATORS OF

J. A. FAY & CO. THE EGAN CO.

1835 ESTABLISHED 1873

Originators and Constructors of

WOOD-WORKING MACHINERY.

MEDALS FOR SUPERIORITY OVER ALL COMPETITORS.

350 awarded us by the various expositions in this country and abroad.

"GRAND PRIX" by the Universal Exposition, Paris, 1889.

Decoration of the "Legion of Honor" conferred by the French Government.

HAND PLANERS. 20 SIZES AND KINDS.

PERFORATED METALS

OF ALL KINDS FOR

MILLING MINING AND AGRICULTURAL MACHINERY,

PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.

THE ROBERT AITCHISON. PERFORATED METAL CO.,

OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.

BEING IN THE BOILER BUSINESS.

MAKING STATIONARY TUBULAR BOILERS EXCLUSIVELY.

WE CAN MAKE A BETTER BOILER AND ALTHOUGH WE MAKE THEM OF FLANGE STEEL WITH WELDLESS BRACES AND ECLIPSE MANHOLES SELL THEM FOR LESS MONEY THAN OLD STYLE ONES.

WE FURNISH NEATER LITHOGRAPHS AND DETAIL ILLUSTRATIONS OF THIS CLASS OF BOILER THAN ANY FIRM IN THE UNITED STATES

FULTON STEAM BOILER WORKS AND FOUNDRY, RICHMOND, IND.

THE STURTEVANT BLOWERS AND EXHAUSTING FANS.

(Known as the Monogram Pattern.) (4)

For Blowing Boiler Fires and Exhausting Dust.

The Sturtevant System of Heating and Ventilating

MANUFACTURING ESTABLISHMENTS.

PORTABLE FORGES.

B. F. STURTEVANT CO., Boston, Mass.

BRANCHES:

91 Liberty St., NEW YORK. 16 S. Canal St., CHICAGO. 15 N. Third St., PHILADELPHIA.

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. mill)	1.60c@1.70c
Angles	1.50c@1.60c
Tees	1.80c@1.90c
Universal Plates	1.60c
Sheared Plates	1.70c

MERCHANT IRON AND STEEL.

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 60
4¼ to 6 by ⅜ to 1 inch	1 65
1¾ to 6 by 1¼ to 2 inch	1 80
1¾ & 1⅞ by ⅜ to ¾ inch	1 65
1 & 1¼ by ⅜ to ¾ inch	1 70
⅝, ¾, ⅞, by ⅜ to ⅝ inch	1 80

Round and Square.

1 to 1⅞ inch	1 60
2 to 2⅝ inch	1 70
2¾ to 3¼ inch	1 85
3⅜ to 4 inch	2 10
4⅛ to 4½ inch	2 79
4¾ to 5 inch	2 95

Oval.

⅜ to 1¼ inch	1 80
⅝ to ¾ inch	1 80
½	2 00
⅜	2 20

Half Oval and Half Round.

1¼ to 3 inch	2 15
⅞ to 1½ inch	1 95
⅝ to ¾ inch	2 20
½	2 35
⅜	3 45

Heavy Band.

1¾ to 6 by ¼ and 5-16 inch	1 70
1 to 1⅜ by ¼ and 5-16 inch	1 75
¾ to ⅞ by ¼ and 5-16 inch	1 85
½ to ⅝ by ¼ and 5-16 inch	2 10

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	2 15
1 7-16 to 2, No. 17, 18 and 19	2 20
1 7 16 to 2, No. 20	2 30
1 7-16 to 2, No. 21	2 40
1 7-16 to 2, No. 22	2 50
1⅛ to 1⅜, No. 13, 14 and 15	2 20
1⅛ to 1⅜, No. 16, 17 and 18	2 25
1⅛ to 1⅜, No 19 and 20	2 30
1⅛ to 1⅜, No. 21	2 40
1⅛ to 1⅜, No. 22	2 50
15-16 and 1 inch, No. 13, 14 and 15	2 25
15-16 and 1 inch, No. 16, 17 and 18	2 30
15-16 and 1 inch, No. 19 and 20	2 40
15-16 and 1 inch, No. 21	2 50
15-16 and 1 inch, No. 22	2 60
⅞, No. 13, 14 and 15	2 40
⅞, No. 16 17 and 18	2 50
⅞, No. 19 and 20	2 60
⅞, No. 21	2 70
⅞, No. 22	2 80
13-16, No. 13, 14 and 15	2 50
13-16, No. 16, 17 and 18	2 60
13-16, No. 19 and 20	2 70
13-16 No. 21	2 80
13-16, No. 22	2 90
¾, No. 13, 14 and 15	2 60
¾, No. 16, 17 and 18	2 75
¾, No. 19 and 20	2 85
¾, No. 21	2 95
¾, No. 22	3 05
11-16, No 13, 14 and 15	2 85
11-16, No. 16, 17 and 18	2 90
11-16, No. 19 and 20	3 00
11-16, No. 21	3 10
11-16, No. 22	3 20
11-16, No. 23	3 30
⅝, No. 13, 14 and 15	2 90
⅝, No. 16, 17 and 18	3 00
⅝, No. 19 and 20	3 10
⅝, No. 21	3 20
⅝, No. 22	3 30
⅝, No. 23	3 40
9-16, No. 13, 14 and 15	3 10
9-16, No. 16, 17 and 18	3 20
9-16, No. and 20	3 30
9-16, No. 21	3 40
9-16, No. 22	3 50
9-16 No. 23	3 60
7-16 and ½ inch, No. 13, 14 and 15	3 30
7-16 and ½ inch, No. 16, 17 and 18	3 40
7-16 and ½ inch, No. 19 and 20	3 50
7-16 and ½ inch, No. 21	3 60
7-16 and ½ inch, No. 22	3 70
7-16 and ½ inch, No. 23	3 80
⅜, No. 13, 14 and 15	3 80
⅜, No. 16, 17 and 18	3 90
⅜, No. 19 and 20	4 00
⅜, No. 21	4 30
⅜, No. 22	4 40
⅜, No. 23	4 55

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 90
1½ to 6 by Nos. 11 and 12	1 95
1 to 1¾ by ⅛ to 3-16 inch	1 95
1 to 1¾ by Nos. 11 and 12	2 00
⅞ and 13-16 by ⅛ to 3-16 inch	2 10
⅞ and 13-16 by Nos. 11 and 12	2 15
¾ and 11-16 by ⅛ to 3-16 inch	2 20
¾ and 11-16 by Nos. 11 and 12	2 25
⅝ and 9 16 by ⅛ to 3-16 inch	2 35
⅝ and 9-16 by Nos. 11 and 12	2 40
½ by ⅛ to 3-16 inch	2 50
½ by Nos. 11 and 12	2 55

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	2 10
⅞ inch, " " " " 13 and 14	2 20
¾ inch, " " " " 11 and 12	2 25
¾ inch, " " " " 13 and 14	2 45

Sheet Iron.

No. 10	2 15
No. 12	2 20
No. 14	2 25

Brainard Milling Machine Co.

EXHIBIT AT

- Machinery Hall, World's Fair, -

COLUMN K 39.

Plain and Universal Milling Machines,

Automatic Gear Cutting Machines,

Special Cam Cutting Machines.

These machines can be seen in operation.

WORKS AT HYDE PARK, MASS.

CHICAGO OFFICE, 14 S. Canal St.

BOSTON OFFICE, 156 Oliver St.

The Iron Trade Review,

CLEVELAND, O. -:- CHICAGO, ILL.

A successful career of **24** years, and a larger advertising patronage and paid subscription list than ever are guarantees to advertisers that this is a medium giving

VALUE RECEIVED.

In the Foundry, Machine Shop, Rolling Mill, Blast Furnace and Iron Ore Interests, its circulation is large and growing. Advertising in THE IRON TRADE REVIEW **Pays.**

HERCULES POWDER

HERCULES,
THE GREAT STUMP AND ROCK
ANNIHILATOR.

SEND FOR DESCRIPTIVE PAMPHLET.

Stump before a blast. | Fragments after a blast.

STRONGEST and SAFEST EXPLOSIVE
Known to the Arts.
POWDER, FUSE, CAPS,
Electric Mining Goods,
AND ALL TOOLS FOR STUMP BLASTING,
FOR SALE BY THE
HERCULES POWDER COMPANY,
40 Prospect Street, Cleveland, Ohio.
J. W. WILLARD, Manager.

No. 15-17	2 35
No. 18	2 50
No. 20	2 60
No. 22-24	2 70
No. 25 26	2 80
No 27	2 90

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 co
Shell	2 25
Flange	2 50
Marine Flange	2 75
Fire Box	3 75

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. ℔. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ½ in. "	08½
7-16 to ⅜ and 2⅜ to 3 in	09
3⅜ to 4 in	09½
⅜ to 11-16 and 4⅛	10
⅛ to 6 in	10½
¼ to 9-32 and 6⅛ to 7 in	11
3-16 in	13

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to ⅜ thick	8

Bessemer and O. H. Steel.

Machinery	base price, 2 10
Tire	" 2 25
Spring	" 2 50
Sleigh Shoe	" 2 50
Toe Calk	" 2 35
Cutter Shoes, tapered and bent	" 2 75

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 80
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 50

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths'	Hill's dis 40
	Bullock's dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 45
Munson's Short Lap Double and Light Double Leather	dis 50
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 30
Horton's Universal	dis 40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	150 gr.	Flour, C. F F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c

FRANK R. BIEDLER,

(PRINCIPAL)
Baltimore Offices,
Moore Building,
S. E. Cor. Baltimore and Hanover Sts.

(BRANCH)
New York Offices
Welles Building,
18 Broadway.

MINING, MINERAL AND TIMBER LANDS

Municipal Bonds, Large Tracts of Florida
Farm and City Mortgages, Phosphate and
Short Time Paper. Hammock Lands.

EXAMINATIONS AND REPORTS MADE. Correspondence Solicited.

THE CYCLONE PORTABLE FORGES

Have Double Ratchet, Solid Frame, Adjustable Legs, Detachable Lever.
Run Lightest, Make Strongest Blast & Last Longest.
ALL DESIRABLE STYLES AND SIZES.
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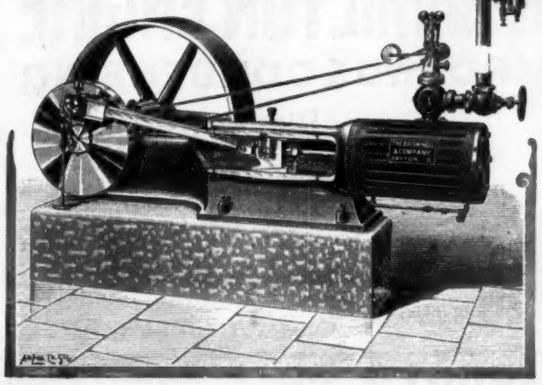

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Grant	dis 55@60
Sterling	dis 60
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60
Vulcanite	dis 60&10
Hamden	dis 60&10
Cyclone	dis 60

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	15c
" " " " over 5 lbs	12c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3¾	3½
Hexagon	15¼	11½	8½	6	5¾	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ℔ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 75
Standard Penny Nails, ℔ keg card rate	
{ Car lots	$1.55
{ Less than car lots	$1.65

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ℔ doz	dis 10@10&10

Packing, Steam.

Boston Belting Co.	dis 60
American Packing Hemp	℔ lb 9@10
Russia " "	℔ lb 14
Italian " "	℔ lb 13@19
Plumbago Piston	℔ lb 40
Peerless	℔ lb 60
Morrison's "	℔ lb 50
Square Flax "	℔ lb 50
Sheet Rubber	℔ lb 12&24
Excelsior Rubber	℔ lb 48
Rainbow { Full Rolls	45c ℔ lb
Rainbow { Less than Full Rolls	50c ℔ lb
Eclipse Gasket	℔ lb 75

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 40
Medart Pulleys	dis 50
Split Wood Pulleys	dis 50@55

Rivets.

Iron, Thousand, list November 17	dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17	dis 50&10@60
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&10
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	dis 20
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40&45
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
" Diamond "	30c "
" Tuttle Tooth Cross-cuts	25c "
" One-man Cross-cuts	32c "
No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Jan. 18, 1884

Brass	dis 30
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ℔ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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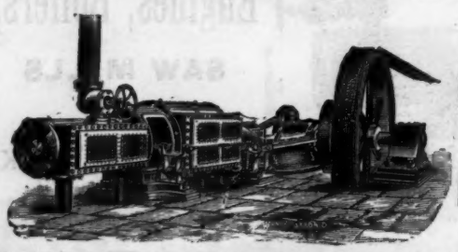

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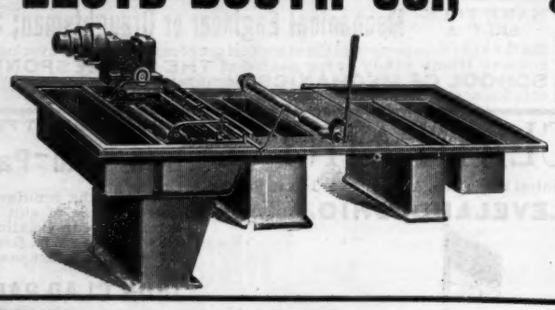

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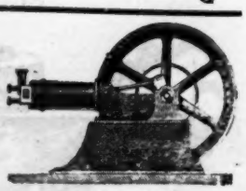

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HARTFORD, CONN.

BURWELL & BRIGGS, General Agents, 208 Superior Street, Cleveland, O.

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J. E. WOLCOTT, Special Agent, 81 4th Avenue, Pittsburgh, Pa.

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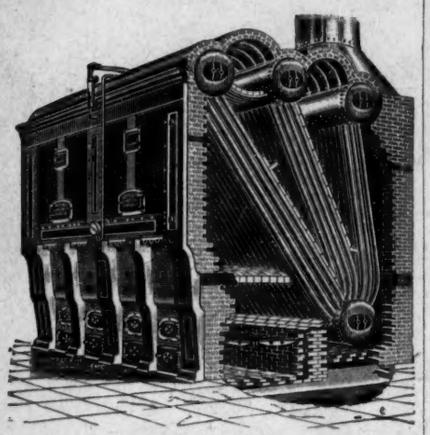

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Ar. Buffalo, 7:30 A.M. | Ar. Cleveland, 8:00 A.M.
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We manufacture

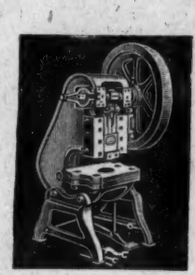

FIG. 3.

Power Punches, Forging Presses,
Power Presses, Trimming Presses,
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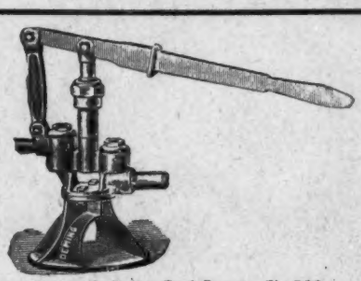
FIG. 25.



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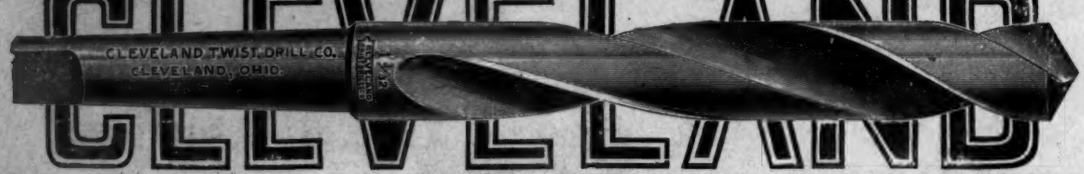

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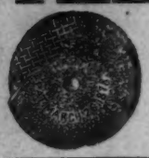

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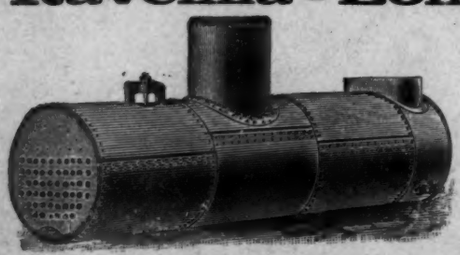

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